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CLI Reference Guide

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In addition to these symbols, this guide may use the following text conventions:

Convention	Explanation
`Typed Command`	Indicates the text that you type in at the keyboard prompt.
Ctrl, **Ctrl** + **Shift**	A key or key sequence to press.
https://www.harmonicinc.com	The italics in blue text indicate cross-references in online documents and external web addresses.
Bold	Indicates a button to click or a menu item to select.
`Screen Output`	The text that is displayed on a computer screen.
Emphasis	The italics text used for emphasis and document references.

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Chapter 1

CLI Commands - syntax and conventions

Overview

This chapter contains the conventions and the syntax rules for the CLI commands used in the CableOS® System Command Line Interface (CLI) and gives a brief explanation of how the CLI Operation works. In addition, there is an explanation of the rules used for the various logging severities.

CLI conventions

CLI commands in CableOS use a set of conventions that enable consistency and readability.

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination ^D or Ctrl-D means that you hold down the Control key while you press the D key (Keys are indicated in capital letters but are not case sensitive).
`code font`	Commands and keywords and user-entered text appear in code font. For example, `show cable modem.`

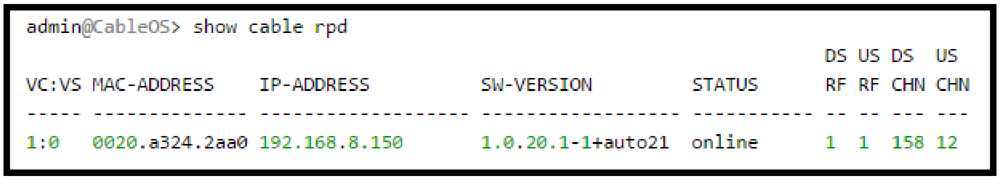
Convention	Description
italic font	Arguments for which you supply values are in *italic* font. For example, `show cable modem` *ipv4-addr*.
`code block`	Terminal session and information system displays appear in `code block`
[x]	Elements in square brackets are optional. For example, `show cable modem` [*ipv4-addr*]
...	An ellipsis (three consecutive non-bolded periods without spaces) after a syntax element indicates that the element can be repeated.
|	A vertical line or bar, called a pipe, indicates a choice within a set of keywords or arguments.
[x | y]	Optional alternative keywords are grouped in brackets and separated by vertical bars. For example, `show cable modem` [*ipv4-addr* | *mac-addr*]
{x | y}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x {y | z}]	A nested set of square brackets or braces indicates optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A non-quoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Non-printing characters such as passwords are in angle brackets.
! #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Remote Phy Device identifiers

Remote Phy Device (RPD) and Remote Phy Shelf (RPS) are identified by CLI in one of three ways:

- **VC:VS Virtual Chassis:Virtual Slot** This identifier is given by the user and is needed to correlate the CLI configuration of the cable chassis physical layer to the CLI cable MAC layer
- **mac-address** This identifier is used to correlate the actual discovered RPD MAC address (by GCP protocol) to VC:VS in CLI
- **ip-address** This identifier is used to correlate the given RPD IP address (static or dynamic DHCP) to VC:VS in CLI

You can see the different identifiers by using the `show cable rpd` command:



```
admin@CableOS> show cable rpd
                                                                        DS US DS  US
VC:VS MAC-ADDRESS    IP-ADDRESS          SW-VERSION         STATUS      RF RF CHN CHN
----- -------------- ------------------- ------------------ ----------- -- -- --- ---
1:0   0020.a324.2aa0 192.168.8.150       1.0.20.1-1+auto21  online      1  1  158 12
```

CLI: Cable interface identifiers syntax

Several *show* commands accept an argument that represents either a single cable interface or a set of multiple cable interfaces indicated by a wild-card asterisk '*' character.

A *cable-interfaces* argument has the following syntax:

cable-interfaces ::= { **md** *vc:vs/pp.d*

| **ds** *vc:vs/pp*

| **ds** *vc:vs/pp/C*

| **ds** *vc:vs/pp : B*

| **us** *vc:vs/pp*

| **us** *vc:vs/pp/C*

| **us** *vc:vs/pp/C.L*

| **us** *vc:vs/pp : B*}

An *md-or-ds-interfaces* argument has the following syntax:

md-or-ds-interfaces ::= { **md** *vc:vs/pp.d*

| **ds** *vc:vs/pp*

| **ds** *vc:vs/pp/C*

| **ds** *vc:vs/pp : B* }

A slot or interface is "administratively up" when it is configured with "admin-state up".

All cable-interfaces are aliased with a capitalized first letter.

Aliases

- **Ds** alias **ds**
- **Us** alias **us**
- **Md** alias **md**

Syntax description

Cable Interface	CLI Syntax	Description
mac-domain	**md** *vc:vs/pp.d*	Selects MAC domains configured with "**cable mac-domain** *vc:vs/pp.d*". An asterisk ('*') for vc selects all "cable chassis vc:". An asterisk for *vs* selects all administratively up 80G12 slots. An asterisk ('*') for *pp* selects all administratively up ports. An asterisk for *d* selects all MAC domains on the ds-rf-port identified by vc:vs/pp. Examples: **md1:9/0.0** **md1:9/*.*** **md*:*/***
ds-rf-port	**ds** *vc:vs/pp*	Selects downstream RF ports configured with "**cable ds-rf-port** *vc:vs/pp*". Examples: **ds1:9/0** **ds1:13/5** **ds1:9/*** **ds1:*/***
down-channel	**ds** *vc:vs/pp/C*	Selects downstream RF channels configured with "**cable ds-rf-port** *vc:vs/pp* **down-channel** *C*". Examples: **ds1:9/0/0** **ds1:9/0/*** **ds1:9/*/*** **ds*:*/*/***

Cable Interface	CLI Syntax	Description
ofdm-channel	**of** *vc:vs/pp/C*	Selects downstream RF channels configured with "**cable ds-rf-port** *vc:vs/pp* **ofdm-channel** *C*". Examples: **of1:9/0/0** **of1:9/0/*** **of1:9/*/*** **of*:*/*/***
ofdma-channel	**oa** *vv:ss/pp/c*	Selects upstream bonded OFDMA channel.
ds-bonding-group	**ds** *vc:vs/pp : B*	Selects downstream bonding groups configured with "**cable mac-domain** *U/n* **ds-bonding-group B**", where the MAC domain uses ds-rf-port *vc:vs/pp. B* is the short *port-dbg-name* of a downstream bonding group. Note that DOCSIS does not consider a downstream bonding group to be an "interface" for purposes of SNMP or CCAP XML configuration; it is merely convenient to include it as a choice in the syntax argument named *cable-interfaces*. Examples: **ds1:9/0:D4A** **ds1:9/0:D16A** **ds1:9/0:*** **ds1:9/*:*** **ds*:*/*:***

Cable Interface	CLI Syntax	Description
down-channel-set	**ds** _vc:vs/pp*_	The syntax “**ds** _vc:vs/pp *_” with an asterisk but no colon or slash after the port _P_ of _vc:vs/pp_ selects all Downstream Channel Sets (DCSs) on the port, that is _both_ non-bonded down-channels and bonding groups on **ds** _vc:vs/pp_. This is the equivalent of the expansion of both “**ds** _vc:vs/pp/*_ ” and “**ds** _vc:vs/pp :*_”. Example: **ds9/0*** Note that the “_P_” of _vc:vs/pp_ may also be an asterisk, forming two consecutive asterisks that mean “all ports, and DCSs on those ports”. Examples: **ds9/**** **ds*/****
us-rf-port	**us** _vc:vs/pp_	Selects the upstream RF ports configured with “**cable us-rf-port** _vc:vs/pp_”. Examples: **us1:1/0** **us1:5/5** **us1:1/*** **us*:*/***
upstream-phy-channel	**us** _vc:vs/pp/C_	Selects upstream physical channels configured with “**cable us-rf-port** _vc:vs/pp_ **us-phy-channel C**”. Examples: **us1:1/0/0** **us1:5/1/5** **us1:1/0/11** **us1:1/0/*** **us1:1/*/*** **us1:*/*/***

Cable Interface	CLI Syntax	Description
us-logical-channel	**us** *vc:vs/pp/C.L*	Selects upstream logical channels configured with “**cable us-rf-port** *vc:vs/pp* **us-phy-channel** *C* **us-logical-channel** *L*”.
us-bonding-group	**us** *vc:vs/pp : B*	Selects upstream bonding groups configured with “**cable mac-domain * us-bonding-group** *B*”, for MAC domains that use us-rf-port **us** *vc:vs/pp*. A MAC domain is said to “use” a us-rf-port when a “*cable fiber-node*” configuration is defined that reaches both that us-rf-port and the ds-rf-port configured for the MAC domain. B is the short *port-ubg-name* of the upstream bonding group. Note that DOCSIS does not consider an upstream bonding group to be an “interface” for purposes of SNMP or CCAP XML configuration; it is merely convenient to include it as a choice in the syntax argument named *cable-interfaces*. Examples: **us1:1/0:U4A** **us1:5/0:U4L** **us1:1/0:*** **us1:1/*:*** **us1:*/*:*** The syntax “**us** *vc:vs/pp* *” with no colon is equivalent to selecting all us-logical-channels and bonding groups on **ds** *vc:vs/pp*, that is the expansion of both “**us** *vc:vs/pp/*.** ” and “**us** *vc:vs/pp :**”. Examples: **us1:1/0*** **us1:1/**** **us1:*/****

CLI: Network Side Interface (NSI) syntax

Several *show* commands accept an argument that represents either a single NSI or a set of multiple NSIs, indicated by a wild-card asterisk '*' character.

The *nsi-interfaces* argument has the following syntax:

nsi-interfaces ::= **nsi** *vc:***cs***/p.bb.sb*

Syntax descriptions

vc	Always 0; Chassis #0 is reserved for the Core.
csXYY	The Core Server number.
p	40 Gb physical port as stamped on the rear server.
bb	The bundle-id as stated in the CLI configuration.
sb	The sub-bundle-d as stated in the CLI configuration.

Example

This example command shows the Ethernet interface 0 for core-server cs032:

```
show interface ethernet 0:32/0
```

Cable modem selection

Many CLI commands can specify that they should be applied only to specific Cable Modems.

Single modem selection

Several *show* commands accept an argument that selects a single CM. The syntax of this argument is:

single-cm ::= { *cm-mac-addr*

| *cm-ip-addr*

| *cm-ipv6-addr*

| **cpe-mac** *cpe-mac-addr*

| **cpe-ip** *cpe-ipv4-addr*

| **cpe-ipv6** *cpe-ipv6-addr* }

Syntax description

cm-mac-addr	A 48-bit MAC address represented by hexadecimal characters *h* as “*hhhh.hhhh.hhhh*”, selecting the single CM with that MAC address.

cm-ip-addr	A dotted decimal IPv4 address in the form "*ddd.ddd.ddd.ddd*" where each *ddd* is the decimal representation of an 8-bit byte, selecting the single CM assigned to that IP address with DHCPv4 relayed through the CableOS Core.
cm-ipv6-addr	A 128-bit IPv6 address in standard IPv6 notation, selecting the single CM assigned to that IPv6 address with DHCPv6 relayed through the CableOS Core.
cpe-mac *cpe-mac-addr*	Selects the single CM through which the CableOS Core relayed DHCPv4 or DHCPv6 to assign an IP address to the 48-bit CPE MAC address *cpe-mac-addr* as expressed in the form "*hhhh.hhhh.hhhh*".
cpe-ip *cpe-ip-addr*	Selects the single CM through which the CableOS Core relayed DHCPv4 to assign a CPE the dotted-decimal IPv4 address *cpe-ip-addr*.
cpe-ipv6 *cpe-ipv6-addr*	Selects the single CM through which the CableOS Core relayed DHCPv6 to assign a CPE the 128-bit IPv6 address *cpe-ipv6-addr*, expressed in standard IPv6 notation.

Multiple modem selection

Several CLI commands include an argument *multiple-cm* that can specify a criterion for selecting the CMs for which the command applies. The syntax for multiple-cm is:

multiple-cm ::= { **bonding**

| **ds-bonding** [*port-dbg-name*]

| **failed-bonding**

| **legacy-ranging**

| **non-bonding-capable**

| **offline**

| **oui** *xx.xx.xx*

| **registered**

| **reject**

| **unregistered**

| **us-bonding** [*port-ubg-name*] }

Syntax description

bonding	Selects CMs registered to receive traffic from a DBG or to send traffic on a UBG. Equivalent to the set of CMs selected either the "**ds-bonding**" or "**us-bonding**" criteria for *multiple-cm*.

ds-bonding [*port-dbg-name*]	Selects registered CMs configured to receive downstream bonded traffic, that is to which the CableOS Core signaled a Requencing DSID (TLV 50.3) in the CM's registration response. If *port-dbg-name* is provided, selects only CMs registered to receive bonded traffic transmitted on the port-unique downstream bonding group name.
failed-bonding	Selects registered bonding-capable CMs (those that advertised MTC Support (TLV 5.26) or MRC Support (TLV 5.29)) and for which any of the following occurred: • The CM initially ranged with the legacy "RNG-REQ" or "INIT-RNG-REQ" message because it failed to detect a downstream MDD, causing the CableOS Core to register the CM with a traditional 1x1 channel configuration; *This is equivalent to the Cisco option "registered-traditional-docsis"*. • The CableOS Core has DBGs configured on the MAC domain of the CM but the downstream SF assignment algorithm failed to assign any DBG to any SF of the CM. • The CableOS Core has UBGs configured on the MAC domain of the CM but the upstream SF assignment algorithm failed to assign any UBG to any SF of the CM.
legacy-ranging	Selects CMs that are currently performing or have completed initial ranging with legacy RNG-REQ or INIT-RNG-REQ messages instead of the DOCSIS 3.0 B-INIT-RNG-REQ message. This includes pre-D3.0 CMs as well as D3.0-or-later CMs that failed to detect downstream MAC Domain Descriptors (MDD) during initialization.
non-bonding-capable	Selects CMs that registered without advertising the capability of Multiple Transmit Channel Support TLV 5.26 or Multiple Receive Channel Support (TLV 5.29). This is a subset of the CMs selected with "**legacy-ranging**", that is those that have completed registration and are known to not support bonding.

offline	Selects offline CMs that are no longer attempting to send ranging requests. The CableOS Core automatically deletes offline CMs after 24 hours.
registered	Selects CMs that are online, that is, they have completed registration and, if required, initial BPI keying. They are reported with a “CM STATE” value of “**online** ...”
unregistered	Selects CMs that are actively initializing, that is, with a reported “CM STATE” other than “**offline**” or “**online**…”
us-bonding \ [*port-ubg-name*]	Selects cable modems that are registered with a service flow assigned to an upstream bonding group. If *port-ubg-name* is also specified, only modems with SFs assigned to that upstream port bonding group name are selected.

CLI Operation

CLI operates in various different modes.

Input Modes

The CableOS CLI has two input modes:

- **exec** mode with the prompt username>
- **config** mode with the prompt username#

In both modes, use the `exit` command to move up in the hierarchy and the `top` command to move to the top of the hierarchy.

Help and Keyword Completion

At any point on a CLI line, enter a question mark “?” to observe all valid inputs accepted in that context.

The CLI accepts partial entry of keywords, as long as the entry uniquely identifies the keyword. For example, the input *show run* is accepted for the `show running-config` command.

Users can type a space or use the TAB key after partial keyword entry to automatically complete the keyword when the partial entry is unique, or to display the possible keyword completions if the partial entry is not unique. The CLI rejects a CLI command if any partial entry does not uniquely identify a keyword.

Harmonic recommends that all script files of CLI commands completely spell out keywords in order to prevent rejection of partial keywords in future releases.

Command Output Processing

The output of any CLI command may be processed by appending to the command a vertical bar (‘**|**’) and a processing option. For example:

```
any-cli-command   |  \
{
| begin regexp
| count
| command
| exclude regexp
| include regexp [+n | -n]
| more
| nomore
| save url
| until regexp
}
```

Syntax Description

begin *regexp*	Begins output with the line that matches a regular expression.
count	Counts the number of lines in the output.
command	Converts hierarchical configuration lines to a “command” format in the form configure *level-0 level-1 level-2…* that concatenates each hierarchical level-n line.
include *regexp* [+n | -n]	Includes lines that match a regular expression, optionally including +n lines after it or –n lines before it.
exclude *regexp*	Excludes lines that match a regular expression, optionally excluding +n lines after it or –n lines before it.
more	Paginates output [default on output to CLI shell]
nomore	Does not paginate output.
save *url*	Saves output text to a URL in the form file://*filename* -- local file system tftp://*host/filename* -- TFTP server ftp://*host/filename* -- FTP server
until *regexp*	Ends with the line that matches a pattern.

CableOS Core supports multiple pipe commands.

Local File System

The CableOS Core maintains a single “flat” directory for the local storage of files visible to CLI sessions. At the Linux shell level of the active CableOS Manager core server, the user directory is stored in the **/srv/cable/os** directory, but to a CLI user, there is simply a single, unnamed directory.

To save a copy of the current running configuration to a local file named “saved.cfg”, enter:

```
User> show running-config | save saved.cfg
```

To show the contents of a file in the local directory, enter the “more” command:

```
 user> more saved.cfg
```

To list the current local files, enter the “dir” command:

```
user> dir
 saved.cfg startup-config
```

To delete a local file, enter the “delete” command:

```
 delete saved.cfg
```

The CableOS Core guarantees that the contents of the local directory are synchronized on both the primary and spare servers.

Passwords

In CableOS, passwords can be set using the `privilege` command.

The special characters that can be used in a password are limited to the following:

`` ?!\"#$%&'()*+,-./:<=>?@[]^_`{}~|\ ``

NOTE: The special character `”` may be used in a password but may not be at the end of the password string. For example, a password of `T4FxN9j4<”` is not valid.

Configuration Databases

After a system reboot, the CableOS Core parses the startup configuration (in hierarchical format) stored in a file named **startup-config**. If this file is not present, the CableOS Core boots with the latest saved (binary) configuration.

In configuration mode, each configuration line is added to a “pending” configuration but not loaded. To observe the current pending configuration in config mode, enter:

```
show configuration
```

For example:

```
user> configure cable mac-domain 1:0/0.0
user# admin-state down
user# show configuration
cable mac-domain 1:0/0.0
```

```
  admin-state down
```

Each CLI session maintains its own pending configuration, and each CLI session commits its own pending configuration independently.

To commit all pending changes to running configuration, enter the command:

```
commit
```

The CableOS Core verifies that all pending changes are valid and consistent. The CableOS Core does not permit commitment of a reference to a configuration object that does not yet exist. If any configuration line is invalid, CableOS Core does not load any of the lines to the running configuration. See the description of the `commit` command for additional options.

NOTE: The running-configuration is accepted for hardware that is not attached, for example, an 80G-12 that is not connected with GCP or a core slice that is not connected to the CRE.

To remove all pending configuration for the current CLI session, enter the command:

```
revert
```

To copy the CableOS Core's running configuration to the startup configuration, enter the command:

```
copy run start
```

Logging

The table below explains the different severities used by the various logging messages and shows examples of when they might be used.

CLI Severity	Syslog Severity	LOG4CXX Severity	Condition
debug	DEBUG	TRACE, DEBUG	Engineer discretion, enabled ONLY with "logging local <server> <service>" or "debug" CLI commands and ONLY for a particular service. Only DEBUG severity events can have packet-level frequency. **Example:** • Receiving a DHCP-OFFER is a DEBUG severity.
information	INFO	INFO	Normal, frequent, expected events **Examples**: • RangingCm or RegisterCm or any change in CM state. • Adding a new lease (after a DHCP ACK).

CLI Severity	Syslog Severity	LOG4CXX Severity	Condition
notice	NOTICE	n/a	Not used by CableOS.
warning	WARNING	WARNING	Infrequent significant events **Example**: • CLI successful commit Infrequent events where the system did not meet a service request for an individual subscriber. No operator action is required other than repeating the service request. **Examples**: • Individual CM registration failure. • Individual phone call failure.
error	ERROR	ERROR	ERROR and higher severities must be "actionable", that is, a customer action is expected. By default, all log destinations receive ERROR and higher. Do NOT use this severity for the MANY internal "error" cases checked by software (for example, queue overflow) - those are not actionable, so they receive the WARNING severity. An ERROR severity event should affect at most one subscriber. Many ERROR severity events do not affect subscribers at all; only the MSO management (for example, lack of a configured SNMP trap destination when they are enabled). **Examples**: • Internal system configuration failure. • Interface link down - indicates problems with a group of CMs. • Resource outage.
critical	CRITICAL	n/a	Not used by CableOS.
alert	ALERT	n/a	Not used by CableOS.

CLI Severity	Syslog Severity	LOG4CXX Severity	Condition
emergency	EMERGENCY	FATAL	EMERGENCY severity requires customer action to restore or prevent loss of service to at least one full MAC domain of subscribers. **Examples**: • Loss of connectivity to an Exo-R/80G12. • Network service such as AAA or DHCP Server disconnect.

RPD Dynamic Configuration

Most commands that update the RPD are performed dynamically. That is that immediately after committing the change, it comes into effect. However, for the following commands, for any changes to the configuration to take effect, you MUST reboot the RPD.

- `cable dsi gcp-ip-address`
- `cable ds-rf-port * analog-overlay-channel-list`
- `cable ds-rf-port * down-channel`, when changing the QAM count
- `cable ds-rf-port oob-channel`, when the RPD is configured as an NDFR device
- `cable ds-rf-port oob-channel bandwidth-mhz`, when the RPD is configured as an NDFR device
- `cable ds-rf-port oob-channel frequency-mhz`, when the RPD is configured as an NDFR device
- `cable ds-rf-port oob-channel oob-core-id`, when the RPD is configured as an NDFR device
- `cable ds-rf-port oob-channel type`
- `cable gcp core-type`
- `cable oob-core`, when the RPD is configured as an NDFR device
- `cable oob-core l2tp-session-id`, when the RPD is configured as an NDFR device
- `cable oob-core mc-dst-ip`, when the RPD is configured as an NDFR device
- `cable oob-core src-ip`, when the RPD is configured as an NDFR device
- `cable oob-dest id`, when the RPD is configured as an NDFR device
- `cable oob-dest l2tp`, when the RPD is configured as an NDFR device
- `cable oob-dest us-vc`, when the RPD is configured as an NDFR device
- `cable rpd early-video`
- `cable rpd ip-stack`
- `cable rpd sfp port`
- `cable rpd video-type`
- `cable service-flow activity-timeout`. Alternatively, take the MAC Domain down and up
- `cable us-rf-port * power-adjust`, if the RPD already has worked in I08 mode of US power adujstment
- `cable us-rf-port oob-channel`, when the RPD is configured as an NDFR device

- `cable us-rf-port oob-channel dest-id`, when the RPD is configured as an NDFR device
- `cable us-rf-port oob-channel dest-id frequency-mhz`, when the RPD is configured as an NDFR device
- `cable us-rf-port us-oob-channel type`
- `set cable rpd * spanning-tree`
- `set rpn * alarm`
- `set rpn agc-pwr-detect`, only if the RPD software version is 1.20 or later
- `set rpn forward-seg`, only if the RPD software version is 1.20 or later

Chapter 2

CLI Commands: a - cab

- *cable ds-rf-port * tilt-pivot-freq-mhz*
- *cable ds-rf-port oob-channel*
- *cable ds-rf-port oob-channel bandwidth-mhz*
- *cable ds-rf-port oob-channel frequency-mhz*
- *cable ds-rf-port oob-channel oob-core-id*
- *cable ds-rf-port oob-channel type*
- *cable ds-traffic-profile*
- *cable dsg cfr*
- *cable dsg client-list*
- *cable dsg tg*
- *cable dsg timer*
- *cable dsg tunnel*
- *cable dsg vendor-param*
- *cable dsi cre-*
- *cable dsi gcp-ip-address*
- *cable dsi lcce-assignment explicit*
- *cable dsi lcce-ip-address-pool*
- *cable dynamic-secret exclude*
- *cable dynamic-secret tftp insert upgrade server*
- *cable event control*
- *cable event priority*
- *cable fiber-node*
- *cable filter group*
- *cable flap-list aging*
- *cable flap-list insertion-time*
- *cable flap-list miss-threshold*
- *cable flap-list power-adjust threshold*
- *cable flap-list size*
- *cable freq-range european*
- *cable gcp core-type*
- *cable l2vpn dot1q*
- *cable l2vpn mpls-to-vlan-mapping*
- *cable lawful-intercept*
- *cable load-balance*
- *cable load-balance balancing-period secs*
- *cable load-balance block-period*
- *cable load-balance docsis-policy*
- *cable load-balance downstream frequency-setting dynamic-lb*
- *cable load-balance downstream frequency-setting static-lb*
- *cable load-balance downstream threshold min-chan-load-pct*
- *cable load-balance downstream threshold min-load-diff-pct*
- *cable load-balance downstream threshold min-stddev-improve-pct*
- *cable load-balance exclude*
- *cable load-balance fail-exclude-period-secs*
- *cable load-balance general default*
- *cable load-balance move-exclude-period-secs*

- *cable load-balance restrict modem*
- *cable load-balance rule*
- *cable load-balance upstream channel-id-setting dynamic-lb*
- *cable load-balance upstream channel-id-setting static-lb*
- *cable load-balance upstream resets-before-exclude-on-dbc-timeout*
- *cable load-balance upstream threshold min-chan-load-pct*
- *cable load-balance upstream threshold min-load-diff-pct*
- *cable load-balance upstream threshold min-stddev-improve-pct*
- *cable mac-address aging-time*
- *cable mac-domain*
- *cable mac-domain-address-oui*
- *cable mac-domain * controller dynamic-bg*
- *cable mac-domain * controller dynamic-us-mod-prof-hopping*
- *cable mac-domain * dbc-active-call*
- *cable mac-domain * dbc-ds-partial-recovery*
- *cable mac-domain * dbc-us-partial-recovery*
- *cable mac-domain * diplexer-band-edge*
- *cable mac-domain * ds-bonding-group*
- *cable mac-domain * ds-dynamic-bonding-group*
- *cable mac-domain * eae*
- *cable mac-domain * force-dpd-time-advance*
- *cable mac-domain * load-balance restricted*
- *cable mac-domain * map-advance*
- *cable mac-domain * map-advance algorithm*
- *cable mac-domain * mcast-channel-set*
- *cable mac-domain * privacy*
- *cable mac-domain * ranging-abort-max-tx*
- *cable mac-domain * rcp use-learned*
- *cable mac-domain * rcp verbose*
- *cable mac-domain * rfog-mode*
- *cable mac-domain * shared-secret*
- *cable mac-domain * shared-secondary-secret*
- *cable mac-domain * sid-range*
- *cable mac-domain * us-bonding-group*
- *cable mac-domain * us-bonding-group *ofdma-channel-set*
- *cable mac-domain * us-dynamic-bonding-group*
- *cable mac-domain * voice-assignment-performance-based*
- *cable mcast*
- *cable md-downstream-qos-profile*
- *cable md-upstream-qos-profile*
- *cable modem deny*
- *cable modem remote-query*
- *cable mod-prof-ofdma*
- *cable modulation-profile*
- *cable nit-replace*
- *cable mtu-enhance*

- *cable ofdm-guard-band*
- *cable oob-core*
- *cable oob-core l2tp-session-id*
- *cable oob-core mc-dst-ip*
- *cable oob-core src-ip*
- *cable oob-dest id*
- *cable oob-dest l2tp*
- *cable oob-dest us-vc*
- *cable privacy accept-self-signed-certificate*
- *cable privacy eae-exclude*
- *cable privacy hotlist*
- *cable privacy skip-certificate-expiration-time*
- *cable proto-throttle*
- *cable provisioning core-ip-address-pool*
- *cable provisioning cre-*
- *cable proxy-arp*
- *cable proxy-nd*
- *cable ptp*
- *cable rcp*
- *cable rip allow-subnet*
- *cable rip authentication*
- *cable rpd*
- *cable rpd early-video*
- *cable rpd ip-stack*
- *cable rpd local-user*
- *cable rpd * mstp*
- *cable rpd nit-replace*
- *cable rpd ptp*
- *cable rpd ptp dscp*
- *cable rpd sfp port*
- *cable rpd sshd*
- *cable rpd ssh-pk-profile*
- *cable rpd us-spectrum-capture*
- *cable rpd use-base-target-rx-power*
- *cable rpd video-type*
- *cable rpn*
- *cable scn-restrict*
- *cable service-class*
- *cable service-flow activity-timeout*
- *cable service-group*
- *cable source-verify group*
- *cable source-verify static*
- *cable ssh-public-key default-profile*
- *cable ssh-public-key profile*
- *cable sub-bundle*
- *cable sub-bundle static-cpe*

- *cable sub-bundle static-cpe-subnet*
- *cable submgmt default active*
- *cable submgmt default filter-group*
- *cable submgmt default cpe-max-ipv4 cpe-max-ipv6*
- *cable template ds-rf-port*
- *cable template ds-rf-port * down-channel*
- *cable template mac-domain*
- *cable template rpd*
- *cable template us-rf-port*
- *cable unjoined-multicast*
- *cable us-channel-admission-control-profile*
- *cable us-rf-port*
- *cable us-rf-port base-target-rx-power-dbmv*
- *cable us-rf-port ofdma-channel*
- *cable us-rf-port ofdma-channel ofdma-prof-mgmt*
- *cable us-rf-port ofdma-channel power-adjust*
- *cable us-rf-port oob-channel*
- *cable us-rf-port us-oob-channel dest-id*
- *cable us-rf-port us-oob-channel frequency-mhz*
- *cable us-rf-port oob-channel power-adjust*
- *cable us-rf-port us-oob-channel type*
- *cable us-rf-port * ofdma-channel * us-channel-admission-control-profile*
- *cable us-rf-port * power-adjust*
- *cable us-rf-port * us-phy-channel*
- *cable us-rf-port us-phy-channel power-adjust-db*
- *cable us-rf-port * us-phy-channel * us-logical-channel * ingress-cancellation*
- *cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile*
- *cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile threshold*
- *cable us-rf-port * us-phy-channel * us-logical-channel * pre-equalization*
- *cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile*
- *cable us-scheduler*

Overview

This chapter contains individual descriptions of the CLI commands within the CableOS System Command Line Interface (CLI). These commands are used to interface with, configure, manage, and maintain the CableOS System.

aaa accounting

To enable authentication, authorization, and accounting (AAA) accounting of requested services for billing or security purposes when you use RADIUS or TACACS+, use the `aaa accounting` command in config mode. To disable AAA accounting, use the **no** form of this command.

```
aaa accounting { default }  { start-stop
{stop-only | none}} group groupname
no aaa accounting {default} {start-stop
{stop-only | none}} group groupname
```

Syntax description

`default`	Uses the listed accounting methods that follow this argument as the default list of methods for accounting services.
`start-stop`	Sends a **start** accounting notice at the beginning of a process and a **stop** accounting notice at the end of a process. The **start** accounting record is sent in the background. The requested user process begins regardless of whether the **start** accounting notice was received by the accounting server.
`stop-only`	Sends a **stop** accounting notice at the end of the requested user process.
`none`	Disables accounting services on this line or interface.
`broadcast`	(Optional) Enables sending accounting records to multiple AAA servers. Simultaneously sends accounting records to the first server in each group. If the first server is unavailable, fail over occurs using the backup servers defined within that group.
`group` `groupname`	At least one of the keywords: **group radius** - Uses the list of all RADIUS servers for authentication as defined by the aaa group server radius command. **group tacacs+** - Uses the list of all TACACS+ servers for authentication as defined by the aaa group server tacacs + command. **group group-name** - Uses a subset of RADIUS or TACACS+ servers for accounting as defined by the server group group-name.

Default

AAA accounting is disabled.

Command mode

Config mode.

Usage guidelines

Use the `aaa accounting` command to enable accounting and to create named method lists defining specific accounting methods on a per-line or per-interface basis.

Examples

The following example defines a default accounting method list, where accounting services are provided by a TACACS+ security server, commands with a stop-only restriction:

```
aaa accounting default stop-only group tacacs+
```

Related information

aaa authorization

aaa new-model

radius-server host

tacacs-server host

aaa authentication login

To set authentication, authorization, and accounting (AAA) authentication at login, use the `aaa authentication login` command in config mode. To disable AAA authentication, use the **no** form of this command.

`aaa authentication login default` *method1* [*method2*]
`no aaa authentication default` *method1* [*method2*]

Syntax description

`default`	Uses the listed authentication methods that follow this argument as the default list of methods when a user logs in.
method1[*method2*...]	At least one of the keywords: **local** - Uses the local user name database for authentication. **group radius** - Uses a list of all RADIUS servers for authentication. **none** - No authorization is performed. ALL CLI commands including privileged commands are shown and executable.

Default

If the default list is not set, only the local user database is checked. This has the same effect as the following command:

```
aaa authentication login default local
```

Command mode

Config mode.

Usage guidelines

The default list you create with the `aaa authentication login` command is used with the `login authentication` command.

Create a list by entering the **aaa authentication login default** *method* command for a particular protocol. The *method* argument identifies the list of methods that the authentication algorithm tries in the given sequence.

The additional methods of authentication are used only if the previous method returns an error, not if it fails. To ensure that the authentication succeeds even if all methods return an error, specify **none** as the final method in the command line.

If authentication is not specifically set for a line, the default is to deny access and no authentication is performed. Use the `show running-config` command to display the currently configured lists of authentication methods.

Examples

The following example creates the same list, but sets it for RADIUS authentication.

```
aaa authentication login default group radius local none
```

Related information

aaa new-model

aaa authorization

To set parameters that restrict user access to a network, use the `aaa authorization` command in config mode. To disable authorization for a function, use the **no** form of this command

```
aaa authorization default { none | tacacs+ }
aaa authorization configure-commands-authorization { enabled | disabled }
aaa authorization configure-prefix { enabled | disabled }
aaa authorization operational-prefix { enabled | disabled }
no aaa authorization
```

Syntax description

`default{none|tacacs+}`	Uses the listed accounting methods that follow this argument as the default list of methods for authorization. At least one of the keywords: **group tacacs+** - Uses a subset of TACACS+ server for authorization as defined by the tacacs-server command. **none** - No authorization is performed. ALL CLI commands including privileged commands are shown and executable.

`configure-commands-authorization {enabled | disabled}`	When disabled, CableOS sends just the word "config" to the TACACS+ server instead of the complete configuration command, as all that is needed is confirmation that the user is authorized to execute config commands. The default is enabled.
`configure-prefix {enabled | disabled}`	When enabled, CableOS adds the prefix "configure" to each command executed by a user in CableOS CLI in config mode when sending this command to the TACACS+ server for authorization. The default is enabled.
`operational-prefix {enabled | disabled}`	When enabled, CableOS adds the prefix "operational" to each command executed by a user in CableOS CLI in operational mode when sending this command to the TACACS+ server for authorization. The default is enabled.

Default

Authorization is disabled for all actions (equivalent to the method keyword **none**).

Command mode

Config mode.

Usage guidelines

Use the `aaa authorization` command to enable authorization and to create named methods lists, defining authorization methods that can be used when a user accesses the specified function. Method lists for authorization define the ways authorization will be performed and the sequence in which these methods will be performed. A method list is simply a named list describing the authorization methods to be used (such as TACACS+), in sequence. Method lists enable you to designate one or more security protocols to be used for authorization, thus ensuring a backup system in case the initial method fails. CableOS software uses the first method listed to authorize users for specific network services; if that method fails to respond, the CableOS software selects the next method listed in the method list. This process continues until there is successful communication with a listed authorization method, or all methods defined are exhausted.

Examples

The following example sets the default authorization method to be performed by the tacacs+ server:

```
aaa authorization default group tacacs+
```

Related information

aaa accounting

aaa new-model

aaa new-model

To enable the authentication, authorization, and accounting (AAA) access control model, use the `aaa new-model` command in config mode. To disable the AAA access control model, use the **no** form of this command.

`aaa new-model`

`no aaa new-model`

Syntax description

This command has no arguments or keywords.

Defaults

AAA is not enabled.

Command mode

Config mode.

Usage guidelines

This command enables the AAA access control system.

Example

The following example initializes AAA:

```
aaa new-model
```

Related information

aaa authentication login

alias

Use the `alias` command to create a command alias. To delete all aliases in a command mode or to delete a specific alias, use the **no** form of this command.

```
alias command-alias original-command
no alias [ command-alias ]
```

Default

The following alias is available with the initial installation of the system:

scm: show cable modem

Command mode

Config mode.

Usage guidelines

Use simple words or abbreviations as command aliases. The original-command should be input without quotes.

Example

The following example creates an alias of src for the `show running config` command:

```
alias src show running config
```

Related information

show cable modem

banner

Use the `banner` command to define and enable customized banners to be displayed before the username and login prompts on an SSH connection. To disable the banners, use the **no** form of the command.

`banner` { *login motd* } [*login_text*]
`no banner`

NOTE: This command is not supported by Telnet.

Syntax description

login	The text will be shown at every login attempt until changed or until banners are disabled.
motd	The text will be shown only today (motd = Message Of The Day). If both banners are enabled, the daily message will be displayed first.
login_text	Free text string to be displayed.

Default

By default, banners are disabled.

Command mode

Config mode.

Usage guidelines

Users can configure a single line banner:

```
banner login “Welcome to our new video system”
```

Use ‘\n’ if a carriage return <CR> is needed to make a two line banner:

```
banner login “Welcome to our new video system\nMake sure to use the correct id and
 password\n”
```

Tokens are also available to be used in messages. For example:

- $(hostname) displays the host name
- $(domain) displays the domain name

Example

The following example enables a login banner and sets the text to **Welcome to our new video system**:

```
banner login “Welcome to our new video system”
```

Related information

hostname

cable aux-core

Use the cable aux-core command to manage the list of auxiliary cores which will be used.

`cable aux-core` [`description` *description*] `ip-addr` *ip-addr*

Syntax description

description	A meaningful description of the core - optional
ip-addr	The IP address of the auxiliary core. Both IPv4 and IPv6 addresses are valid.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

Use the cable rpd command to associate auxiliary cores with specific RPDs.

Examples

The following example shows how to configure different options of auxiliary cores

```
a@CableOS(config)# cable aux-core 1

a@CableOS(config-aux-core-1)# description "oob-core"

a@CableOS(config-aux-core-2)# ip-addr 3000:200:39::64
```

```
a@CableOS(config-aux-core-1)# cable aux-core 2
a@CableOS(config-aux-core-2)# ip-addr 200.200.206.100
a@CableOS(config-aux-core-2)# commit
Commit complete.
a@CableOS(config-aux-core-2)#
a@CableOS(config)#
a@CableOS> show running-config cable aux-core
cable aux-core 1
description oob-core
ip-addr 3000:200:39::64
!
cable aux-core 2
ip-addr 200.200.206.100
!
```

Related information

cable rpd

cable bpi-enforce

Use the `cable bpi-enforce` command to enforce the registration of non-BPI cable modems.

`cable bpi-enforce` [{ *enabled* | *disabled* }]

Syntax description

enabled	Allows the registration of non-BPI cable modems.
disabled	Does not allow the registration of non-BPI cable modems. This is the default value.

Default

BPI registration is disabled by default.

Command mode

Config mode.

Example

The following example enables the registration of non-BPI cable modems:

```
cable bpi-enforce enabled
```

cable bundle

Use the `cable bundle` command to control from which subnets the CMs and CPEs in a MAC domain will receive IPs.

- Create a cable bundle
- Define the VLAN for the created cable bundle
- [Optional] Create custom host types, such as TIVO, that are not included in the standard DOCSIS equipment classifications; these custom host types can be used only in the child cable sub-bundles created under the parent cable bundle
- [Optional] Create custom cm-reg-tlv43 patterns to recognize modems of different Wholesale Partners (WSPs).

To create a cable bundle, use this command:

`cable bundle` *bundle-id* [*description*] [`cre-vlan-id` *vlan-id*] [`host-type-custom...`] [`cm-reg-tlv43` *pattern-name*]

To delete a cable bundle definition:

`no cable bundle` *bundle-id*

Cable bundles and sub-bundles are used to control from which subnets the CMs and CPEs (Customer Premises Equipment) in a MAC domain will receive IPs. When the cable bundle is created, its VLAN is defined and MAC domains are associated with the cable bundle. Then, during the DHCP Discover phase, the CableOS server associates all devices in the MAC domain(s) to the bundle VLAN, which in turn is associated with the proper subnets on the CRE.

NOTE:

All services contained in a MAC domain may be included in a single, associated cable bundle, but many ecosystems require that services be separated into subsidiary cable sub-bundles, configured under a top-level cable bundle, for added granularity and control. Cable sub-bundle configuration is described in *cable sub-bundle*.

Syntax description

bundle-id	(Mandatory) <Integer 1...15. Default 1 The ID of the cable bundle.
description	Arbitrary text.
cre-vlan-id *vlan-id*	(Mandatory) Default 300 Valid ID of the VLAN configured in the CRE. You can define only one VLAN in a single bundle definition.

`[host-type-custom...]`	(Optional) Configure custom host type not included in the standard DOCSIS host definitions. You can define multiple custom host types in a cable bundle. These custom host types are used in cable sub-bundles created under the parent cable bundle. The **[host-type-custom]** argument parameters are configured from a sub-configuration mode opened when you define the **[host-type-custom]** name; the **[host-type-custom]** argument full syntax is as follows:
`[host-type-custom...]` *type-name* The system enters the [host-type-custom] configuration mode prompt: (host-type-custom type-name)# Enter remaining argument parameters from this prompt: **(host-type-custom type-name)#**dhcp-version {DHCP | DHCPv6} **(host-type-custom type-name)#**dhcp-option *number* {exists | not-exists | **type** {ascii | hex | dec} {contains | eq | neq | not-contains} *[value1 value2...]* ¶ **(host-type-custom type-name)#**[dhcp-option *number* {exists | not-exists | **type** {ascii | hex | dec} {contains | eq | neq | not-contains} *[value1 value2...]*] ¶ **(host-type-custom type-name)#**[dhcp-option *number*,...] ¶	**host-type-custom** *type-name*: (Mandatory) • <string: any alphanumeric character and special character> Examples: TIVO1; Dimitri17 • **dhcp-version**: (Mandatory) Range: DHCP for IPv4 mode, DHCPv6 for IPv6 mode • **dhcp-option**: (Mandatory) Usage guidelines are: You can define multiple **dhcp-option** classifiers. There is no limit to the number of **dhcp-option** classifiers. If you define multiple classifiers, they are all executed in an **AND** operation. • *number*: the DHCP option number, such as **60** or **43**, used by the DHCP server to configure DHCP host with required parameters. The designated **dhcp-option** *number* must be qualified to ensure that the CORE server properly reads the DHCP message in the Discover (IPv4) or Solicitation (IPv6) process; choose one of the following qualifiers: • **exists**: the **dhcp-option** *number* exists in the DHCP message; if not, the message is invalid. • **not-exists**: The **dhcp-option** *number* does **not** exist in the DHCP message; if the option number is found in the message, the message is invalid. • Specify **type** (attributes) of the **dhcp-option** *number:*

(host-type-custom type-name)#host-type {cpe | eDVA | eMTA | ePS | eRouter | eSG | eSTB | eTEA}] • where **¶** means **“press <Enter>”**	• One of (you must choose one): **ascii** OR **hex** OR **dec** One of (you must choose one): **contains** *[value1 value2...]*: The DHCP message contains any of the designated values (*value1*, *value2*, etc.) among other values that may be present; if not, the message is invalid. **eq** *value* (no square brackets for single value): The DHCP message must contain only this single value and no others; if it does not contain that value and/or other values are included, the message is invalid. **neq** *value* (no square brackets for single value): The DHCP message can contain any but this value; if this value is in the message, the message is invalid. **not-contains** *[value1 value2...]*: All values in the message are valid, except for these values; if any of these values are in the message, the message is invalid. [**and dhcp-option**]: Optional • Add additional **dhcp-option** definitions • The additional **dhcp-option** numbers are defined in the same way as the first **host-type** {*cpe* | *eDVA* | *eMTA* | *ePS* | *eRouter* | *eSG* | *eSTB* | *eTEA*} (Mandatory) Select the standard DOCSIS host type; the custom host type will appear as the selected standard DOCSIS host type when **scm** (show cable modem) commands are executed.
`cm-reg-tlv43`	(Optional) This field configures a cm-reg-tlv43 pattern. You can define multiple cm-reg-tlv43 patterns in a cable bundle. These patterns are used in cable sub-bundles created under the parent cable bundle. They are configured from a sub-configuration mode that opens when you define the `cm-reg-tlv43` name. The `cm-reg-tlv43` full syntax is as follows:

<table>
<tr>
<td><code>cm-reg-tlv43</code> <em>pattern-name</em></td>
<td>
The pattern name configuration has three mandatory arguments:
<table>
<tr><td><strong><em>pattern-name</em></strong></td><td>An alphanumeric string of any length, for example, WSP1.</td></tr>
<tr><td><strong><em>vendor-id</em></strong></td><td>The format is XX:XX:XX, where XX is a hexadecimal number. The Vendor ID is a 3-byte field.</td></tr>
<tr><td><strong><em>vendor-data</em></strong></td><td>The vendor data is a series of 2-digit hexadecimal numbers, separated by colons.</td></tr>
</table>
You can define multiple <code>cm-reg-tlv43</code> patterns - there is no limit to the number.
<strong>NOTE:</strong> This definition matches only TLV43 Sub-TLV 8.
</td>
</tr>
</table>

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

See the descriptions in the *Syntax description* for usage guidelines.

Example

The following example creates a cable bundle with a custom host type:

```
cable bundle 1 cre-vlan-id 369 host-type-custom TIVO dhcp-version DHCP dhcp-option
 12 ascii contains [TIVO]¶
dhcp-option 60 not exists¶
host-type eSTB
```

The following example creates a cable bundle with a custom host type and a cm-reg-tlv43:

```
cable bundle 1
cre-vlan-id 369
host-type-custom TIVO dhcp-version DHCP dhcp-option 12 ascii contains [TIVO] dhcp-
option 60 not-exists
 host-type eSTB
cm-reg-tlv43 WSP1 vendor-id 00:18:10 vendor-data 04:08:00:00:7A:66:00:00:00:01¶
```

NOTE: The corresponding binary format of the cm-reg-tlv43 definition in the cable modem configuration file is: **08:03**:00:18:10:04:08:00:00:7A:66:00:00:00:01

Related information

cable sub-bundle

cable bundle static-cpe-subnet
cable bundle dhcpv6-option

cable bundle dhcp-options

Use the `cable bundle dhcp-options` command to enable the insertion of the hostname and the upstream description into DHCP packets.

```
cable bundle  bundle-id { dhcp-options v4 option-82 | dhcp-options v6 option-17 }
hostname
{ enabled | disabled }
cable bundle  bundle-id { dhcp-options v4 option-82 | dhcp-options v6 option-17 }
upstream-description
{ enabled | disabled }
```

Syntax description

bundle-id	The ID of the Cable Bundle. Integer in the range 1-15.
`dhcp-options v4 option-82|dhcp-options v6 option-17`	Use `dhcp-options v4 option-82` for DHCPv4 and `dhcp-options v6 option-17` for DHCPv6.
`hostname`	The enabled/disabled keyword is for the hostname
`upstream-description`	The enabled/disabled keyword is for the upstream description.
`enabled|disabled`	`enabled`: include the hostname or upstream description into option-82 (DHCPv4 packets) or into option-17 (DHCPv6 packets) `disabled`: exclude the hostname or upstream description from option-82 (DHCPv4 packets) or from option-17 (DHCPv6 packets) This is the default.

Default

By default, these options are disabled.

Command mode

Config mode

Usage guidelines

Before enabling the insertion of the hostname, the hostname must also be defined using the `hostname` command.

Before enabling the insertion of the description, the description must also be defined using the `cable us-rf-port vc:vs/p description` command. This description is truncated to 32 characters when added to the dhcp option.

Examples

The example below enables the insertion of the hostname into DHCPv4 packets for cable bundle 2:

```
cable bundle 2 dhcp-options v4 option-82 hostname enabled
```

The example below disables the insertion of the hostname into DHCPv6 packets for cable bundle 3:

```
cable bundle 3 dhcp-options v6 option-17 hostname disabled
```

The example below enables the insertion of the hostname into DHCPv4 packets for cable bundle 1:

```
cable bundle 1 dhcp-options v4 option-82 upstream-description enabled
```

The example below disables the insertion of the hostname into DHCPv6 packets for cable bundle 1:

```
cable bundle 1 dhcp-options v6 option-17 upstream-description disabled
```

cable bundle dhcpv6-option

Use the `cable bundle dhcpv6-option` command to enable DHCPv6 options 18 (Interface-ID) and 37 (Remote Identifier) to be entered in ASCII format.

`cable bundle` *bundle-id* [`dhcpv6-option-18-format` *option-18-format*] [`dhcpv6-option-37-format` *option-37-format*]

Syntax description

bundle-id	The ID of the Cable Bundle. Integer in the range 1-15.
option-18-format	The format in which option 18 will be configured. The valid values are either **bin** or **ascii**.
option-37-format	The format in which option 37 will be configured. The valid values are either **bin** or **ascii**.

Default

This command has no default value.

Command mode

Config mode.

Examples

The example below sets the format for option 18 in bundle 1 to ascii.

```
cable bundle 1 dhcpv6-option-18-format ascii
```

Related information

cable bundle

cable bundle dhcpv6-option-79

Use the `cable bundle dhcpv6-option-79` command to enable or disable injecting DHCPv6 option 79 (RFC 6939) to RELAY-FORW messages sent by the CableOS Core.

`cable bundle` { *bundle-id* } `dhcpv6-option-79` { `enabled` | `disabled` }

Syntax description

bundle-id	The ID of the Cable Bundle. Integer in the range 1-15.

Default

By default, the option is disabled

Command mode

Config mode

Usage guidelines

When enabled, DHCPv6 RELAY-FORW messages relayed by CableOS Core will include DHCPv6 option 79 (RFC 6939) with the Client Link-Layer address. The Client Link-Layer address is a 6-byte MAC address and its value is taken from the source MAC address field of the Ethernet header of the original DHCPv6 message sent bythe CM or the CPE.

When disabled, CableOS Core does not include this DHCPv6 option in DHCPv6 RELAY-FORW messages.

Examples

This example enables the option for cable bundle 1:

```
cable bundle 1 dhcpv6-option-79 enabled
```

This example disables the option for cable bundle 1:

```
cable bundle 1 dhcpv6-option-79 disabled
```

cable bundle source-verify dhcp-server

Use the cable bundle source-verify dhcp-server command to configure a Dynamic Host Configuration Protocol (DHCP) server to which the CableOS Core sends DHCP LEASEQUERY messages for unknown CPE IP addresses.

`cable bundle source-verify dhcp-server` *bundle-id dhcp-server-addr*

To remove a previously configured server, use the following

`cable bundle no source-verify dhcp-server` *dhcp-server-addr*

Syntax description

bundle-id	The ID of the Cable Bundle. Integer in the range 1-15.
dhcp-serer-addr	The IP address (either IPv4 or IPv6) of the DHCP server.

Command mode

Config mode

Usage guidelines

When **cable mac-domain * source-verify enabled** is configured for a mac-domain, the COS Core verifies that upstream source IP addresses are authorized either by either snooping DHCP or a static SAV configuration. The COS Core also verifies that downstream IP packets are sent to a known destination MAC address of an authorized CPE IP address and that downstream ARP requests from the CRE are for target IP addresses that are authorized.. In either the upstream or downstream case, when an IP address is unauthorized, the COS Core sends a DHCPLEASEQUERY message to a DHCP server to attempt to authorized the IP address. The COS Core sends in parallel to all DHCP servers of the same IP type (IPv4 or IPv6) configured in the cable bundle to which the mac-domain of the CM sending or receiving the packet belongs.

For LQ to function properly source-verify must be enabled on the mac-domain. When SAV is disabled for MD, LQ should not be triggered.

The CableOS Core accepts a maximum of 4 dhcp-server IP addresses per cable bundle, in any combination of IPv4 and IPv6.

Examples

```
(config)#                  cable bundle 1
   (config-bundle-1)     source-verify dhcp-server 10.10.10.2
   (config-bundle-1)     source-verify dhcp-server 2010:10:10::2
   (config-bundle-1)     commit
```

```
(config)#                  cable bundle 1
   (config-bundle-1)     no source-verify dhcp-server 10.10.10.2
   (config-bundle-1)     commit
```

Related information

cable bundle source-verify leasequery downstream

cable bundle source-verify leasequery upstream

cable bundle source-verify leasequery downstream

Use the `cable bundle source-verify leasequery downstream` command to enable Dynamic Host Configuration Protocol (DHCP) LEASEQUERY request messages to be sent for downstream unknown IP addresses.

`cable bundle` *bundle-id* `source-verify leasequery [ ipv6 ] downstream enabled requests-per-sec` *rate*

To disable DHCP LEASEQUERY messages from being sent by the CableOS Core for unknown downstream IP destination addresses:

`cable bundle` *bundle-id* `source-verify leasequery [ ipv6 ] downstream disabled`

Syntax description

`bundle-id`	The ID of the Cable Bundle. Integer in the range 1-15.
`ipv6`	Optional. If absent, selects control of IPv4 downstream leasequery operations; if present, selects control of IPv6 downstream leasequery operations.
`enabled`	Enables the CableOS Core to send DHCP LEASEQUERY messages to the DHCP Server configured for the cable bundle when a downstream IP packet is forwarded to an otherwise unknown IP destination address.
`disabled`	(Default) Disables the CableOS Core from sending DHCP LEASEQUERY messages for downstream IP packets destined to an unknown IP destination address.
rate	Rate of LEASEQUERY request sending in messages per second when downstream leasequery is enabled. This rate is per system. Optional, range 1 - 100, default 5.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

When cable mac-domain * source-verify enabled is configured for a MAC domain, the CableOS Core sends a DHCP LEASEQUERY request to a DHCP server to verify unknown IP addresses that are found in packets to and from customer premises equipment (CPE) devices that are using the cable modems on the cable interface. The DHCP server returns a DHCP ACK message with the MAC address of the CPE device that has been assigned this IP address, if any. The CableOS Core thus verifies that this CPE device is authorized to use this IP address. To prevent Denial of Service (DOS) attacks, the rate of downstream LEASEQUERY messages is limited according to the request-per-sec *rate* setting.

Example

The following example enables downstream LEASEQUERY messages for cable bundle 1 at the default rate:

```
cable bundle 1
source-verify leasequery downstream enabled
```

Related information

cable bundle source-verify leasequery upstream
cable source-verify group
cable source-verify static
show cable modem leasequery-filter
cable bundle source-verify dhcp-server

cable bundle source-verify leasequery upstream

Use the `cable bundle source-verify leasequery upstream` command to enable Dynamic Host Configuration Protocol (DHCP) LEASEQUERY request messages to be sent for upstream unknown IP addresses.

`cable bundle` *bundle-id* `source-verify leasequery [ ipv6 ] upstream enabled requests-per-sec` *rate*

To disable DHCP LEASEQUERY messages from being sent by the CableOS Core for unknown upstream IP destination addresses:

`cable bundle` *bundle-id* `source-verify leasequery [ ipv6 ] upstream disabled`

Syntax description

`bundle-id`	The ID of the Cable Bundle. Integer in the range 1-15.
`ipv6`	Optional. If absent, selects control of IPv4 downstream leasequery operations; if present, selects control of IPv6 downstream leasequery operations.

`enabled`	Enables the CableOS Core to send DHCP LEASEQUERY messages to the DHCP Server configured for the cable bundle when a upstream IP packet is forwarded to an otherwise unknown IP destination address.
`disabled`	(Default) Disables the CableOS Core from sending DHCP LEASEQUERY messages for upstream IP packets destined to an unknown IP destination address.
rate	Rate of LEASEQUERY request sending in messages per second when upstream leasequery is enabled. This rate is per cable modem. Optional, range 1 - 100, default 5.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

When cable mac-domain * source-verify enabled is configured for a MAC domain, the CableOS Core sends a DHCP LEASEQUERY request to a DHCP server to verify unknown IP addresses that are found in packets to and from customer premises equipment (CPE) devices that are using the cable modems on the cable interface. The DHCP server returns a DHCP ACK message with the MAC address of the CPE device that has been assigned this IP address, if any. The CableOS Core thus verifies that this CPE device is authorized to use this IP address. To prevent Denial of Service (DOS) attacks, the rate of upstream LEASEQUERY messages is limited according to the request-per-sec *rate* setting.

Example

The following example enables upstream LEASEQUERY messages for cable bundle 1 at the default rate:

```
cable bundle 1
source-verify leasequery upstream enabled
```

Related information

cable bundle source-verify leasequery downstream

cable source-verify group

cable source-verify static

show cable modem leasequery-filter

cable bundle source-verify dhcp-server

cable bundle static-cpe

Use the `cable bundle static-cpe` command to define a static IP address for a given CPE device.

`cable bundle` *bundle-id* `static-cpe cpe-ip` *CPE IP address* `cm-mac` *CM MAC address* `cpe-mac` *CPE MAC address*

Syntax description

`bundle-id`	The ID of the Cable Bundle. Integer in the range 1-15.
`CPE IP address`	The static IP address of the CPE device in nnn.nnn.nnn.nnn format. Only IPv4 addresses are valid.
`CM MAC address`	The full 6 octet MAC address of the cable modem.
`CPE MAC address`	The full 6 octet MAC address of the CPE Device.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Example

The following example sets the IP address 140.99.2.101 as the static address for the CPE AA:BB:CC:DD:EE:FF of CM AA:BB:CC:DD:EE:FF in cable bundle 1:

```
cable bundle 1
static-cpe cpe-ip 140.99.2.101 cm-mac AA:BB:CC:DD:EE:FF cpe-mac AA:BB:CC:DD:EE:FF
```

Related information

cable bundle

cable sub-bundle static-cpe

cable sub-bundle

cable bundle static-cpe-subnet

Use the `cable bundle static-cpe-subnet` command to define a static IP subnet for a given CPE device.

`cable bundle` *bundle-id* `static-cpe-subnet` *subnet* [`timeout` *timeout-min*]

To delete the subnet, use the **no** form of the command. Use one of the following formats:

`cable bundle` *bundle-id*
`no static-cpe-subnet` *subnet*

Or:

`no cable bundle` *bundle-id* `static-cpe-subnet` *subnet*

Syntax description

bundle-id	The ID of the Cable Bundle. Integer in the range 1 - 15.
subnet	The IPv4 or IPv6 subnet in CIDR notation
timeout-min	The timeout value in minutes. The default value is 240 minutes (4 hours). When the timeout expires, the CPE is removed.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

The configuration item in the parent container is identified by “ipv4 or ipv6 subnet in CIDR notation”, so there can be no duplication in the same bundle or sub-bundle.

Currently there is no validation for overlapping between configured subnets. It is the user’s responsibility to configure the system properly.

Every subnet should be configured under a bundle or a sub-bundle. The traffic of the CPEs will be tagged with the VLAN tag of a particular bundle or sub-bundle.

To be added, the CPE should send some upstream traffic. Downstream packets do not trigger learning of the static CPEs. This is to avoid bogus static CPEs or duplication of static CPEs on different systems.

When the timeout expires the CPE is removed. To be re-added, the CPE should send an upstream packet.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Example

```
cable bundle 1
static-cpe-subnet 192.168.0.0/16 timeout 86400
```

Related information

cable bundle

cable bundle static-cpe

cable sub-bundle static-cpe-subnet

cable cm-status

Use the `cable cm-status` command to enable a CM status event or a group of CM status events on a primary cable interface. To revert to the default values, use the **no** form of the command.

`cable cm-status` *event code* | `holdoff` *holdofftimer* | | `reports` *reportnumber* |
`no cable cm-status`

Syntax description

event code	Event Type Code, as defined in the CM-STATUS Event Type Codes and Status Events table in the DOCSIS 3.1 Interface Specifications.
holdofftimer	Maximum Event Holdoff Timer in units of 20 milliseconds. Valid range: 1..65535.
reportnumber	Maximum Number of Reports per event: 0: Unlimited number of reports 1 – 255: Maximum number of reports for an event type reporting transaction.

Default

The default values are:

- Holdoff timer - 50
- Report value - 3

Command mode

Config mode.

Usage guidelines

The CM-STATUS reporting mechanism includes a random holdoff prior to transmission of status report messages. This TLV indicates the value of the random holdoff timer to be used by the CM when determining when/whether to transmit a CM-STATUS message. This TLV associates a separate holdoff timer value with each CM-STATUS event type code managed by the CMTS. When the CM receives an MDD message on its primary downstream channel that does not include an Event Control Encoding for an event type, the CM does not transmit CM-STATUS messages with that event type code. A valid MDD message may have any number of CM-STATUS Event Control Encodings as long as each event code is unique.

Event reporting is enabled jointly by the presence of the appropriate Event Control TLV and the appropriate bit in the CM-STATUS Event Enable Bit Mask TLV 1.5, 7.2, 15 or 20. Refer to the CM Status Report section in the DOCSIS 3.1 Interface Specifications for requirements for enabling event reporting. The CMTS MAY include one instance of this TLV in a MDD message on a primary-capable downstream channel. When sending an MDD on a non-primary-capable downstream channel, the CMTS MUST NOT include this TLV. The CMTS MUST comply with the Downstream Ambiguity Resolution Frequency List TLV table in the DOCSIS 3.1 Interface Specifications.

Examples

The following example sets a holdoff time of 600 milliseconds (30 x 20) and a maximum of 4 reports for event number 26:

```
cable cm-status 26
holdoff 30
reports 4
```

The example below shows the recommended default status for all configurations, including configurations that do not explicitly configure cm-status and use the implicit default settings:

```
cable cm-status 1-3,6-7,16-21
 holdoff 250
 reports 3
!
cable cm-status 4-5,8-15,25-27
 holdoff 1500
 reports 3
!
cable cm-status 22-24
 holdoff 30000
 reports 3
```

cable cmts-steering

Use the `cable cmts-steering` command to enable and disable the CableOS Core CMTS Steering feature.

`cable cmts-steering enabled` `redirect-ds-frequency-mhz` *redirect-ds-frequency1 redirect-ds-frequency2* < *redirect-ds-frequency3* < *redirect-ds-frequency4* > >

```
cable cmts-steering disabled
```

Syntax description

`enabled`	Enables the CMTS Steering operation. When a CM attempts to register without a TLV-1 Downstream Frequency Setting in its REG-REQ message, the CableOS Core redirects the CM to initialize on the downstream frequency *redirect-ds-frequency*. When more than one frequency is configured, the CM steering feature steers CMs to each frequency in a round robin fashion. For this configuration, the CableOS Core requires that the *redirect-ds-frequency-mhz* parameter is also defined.
`disabled`	Disables the CMTS Steering operation. (Default) When CMTS Steering is disabled, the CableOS Core does not require TLV-1 to be present in a REG-REQ message in order to continue registration.
`redirect-ds-frequency`	Center SCQAM downstream frequency in megahertz, expressed as a decimal number in the range 57.000 to 999.000, with a granularity of 0.125 MHz. When CMTS Steering is enabled and TLV-1 is not present and set to an operational upstream channel in a CM Registration Request, this is the downstream frequency to which the CableOS Core redirects the CM to re-initialize. Up to four frequencies can be defined, separated by commas with no spaces.

Default

By default, CMTS Steering is disabled.

Command mode

Config mode.

Usage guidelines

The CMTS Steering feature permits the CableOS Core to operate in parallel with a different "Production" CMTS on the same RF plant by "steering" CMs to the intended CMTS. Advantages of the feature include:

- It enables "beta" testing of the CableOS Core to a subset of subscribers normally served by the Production CMTS.
- It eases the transition to R-PHY deployment by permitting the CableOS Core driving an R-PHY device and a Production CMTS driving an analog HFC fiber-node to operate in parallel.

As an RF overlay, the CableOS Core uses different downstream and upstream frequencies than the Production CMTS; CMTS Steering is required because a CM might attempt to initially range on a downstream of either CMTS. The CableOS Core CMTS Steering feature requires modification to only the CableOS Core CMTS configuration and the CM configuration files intended to register on the CableOS Core; no change is required to the Production CMTS configuration or its intended CMs' configuration.

The feature requires adding TLV-1 "Downstream Frequency Setting" in the CM configuration file of CMs intended for the CableOS Core, setting it to the downstream frequency of a channel configured on the MAC domain of the CableOS Core.

The scenarios which require steering an initializing CM to a different CMTS are :

- A CableOS Core CM initially ranges on the Production CMTS, in which case the TLV-1 in the CableOS Core CM configuration file causes the CM to re-initialize at the frequency of a downstream channel of the CableOS Core.
- A Production CM initially ranges on the CableOS Core, in which case the absence of TLV-1 in the REG-REQ of the CM causes the CableOS Core to redirect the CM to re-initialize at the frequency of a downstream channel of the Production CMTS.

CMs on the Production CMTS might use TLV-1 as well, in which case the CM will redirect itself to the Production downstream frequency before sending a REG-REQ to the CableOS Core.

NOTE:

When the CableOS Core redirects a CM to the other CMTS, it MIGHT respond to REG-REQ with an unsolicited RNG-RSP to the CM with the Downstream Frequency Override sub-TLV (6) set to other-ds-frequency (preferred method).
An acceptable alternative implementation is to complete registration and immediately send a DCC directing it to re-init its MAC on the different downstream frequency.

Example

The following example enables CMTS Steering, redirecting to the Production CMTS frequencies of 555 MHz and then to 654 MHz, if a CM attempts to register without that service type:

```
cable cmts-steering enabled redirect-ds-frequency-mhz 555.000,654.000
```

cable core-type

Use the `cable core-type` command to configure the core type and what configuration it is allowed to send to the R-PHY.

`cable core-type` *core-type* [`config-category` *category*]

Syntax description

core-type	The core-type can be either `auxilliary` or `principal`, as defined in the CableLabs specifications. It is used in cosm-gcp to manage the allowed actions for GCP configuration for R-PHY. The default value is **principal**.
category	Defines what GCP configurations can be sent by the server to the R-PHY. This parameter is shown only for the auxiliary core type. Possible values are any combination of: docsis, video, oob, ptp, ripple. The default value is **docsis**. If you want more than one value, use a comma-separated list.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

This definition is used by the cosm-gcp service to manage GCP configuration actions for R-PHY.

Example

The following example defines the core as an auxiliary core and allows it to send PTP and OOB configuration information:

```
cable core type auxilliary config-category ptp,oob
```

cable ds-channel-admission-control-profile

Use the `cable ds-channel-admission-control-profile` command to create a named profile containing downstream bandwidth thresholds for Data, Voice, and Voice Emergency.

`cable ds-channel-admission-control-profile` [*profile-name* | `default`][`class` { *DS QoS class name* }][`reserved-bandwidth` { `exclusive percent` *percentage* | `unlimited` }]

Syntax description

`profile-name`	DS channel admission control profile can have any name.
DS QoS class name	DS class *names* are: • `DsReserved` • `DsVoice` • `DsVoiceEm` Where: • `DsReserved` = data • `DsVoice` = voice • `DsVoiceEm` = voice emergency
`exclusive percent` *`percentage`*	`exclusive percent`: Keyword. *percentage*: The percentage, `0-80`, of reserved exclusive bandwidth allocated to the `DS QoS class`.
`unlimited`	Argument - allocates unlimited exclusive bandwidth to the `DS QoS class`.

Default

A profile with the name *default* contains the following downstream bandwidth thresholds for the following QoS classes:

- `DsReserved` - unlimited
- `DsVoice` - 40%
- `DsVoiceEm` - 10%

A user may edit the profile named `default` in order to modify the default settings. The default profile will be used by channels that are not configured with a specific profile.

Command mode

Exec mode.

Usage guidelines

An unconfigured QoS class is assumed to be set to `unlimited`.

The total bandwidth reserved for all QoS classes cannot exceed 80% of the total channel bandwidth.

`ds-channel-admission-control-profile` is applied per channel under RF port.

Examples

The following is an example of configuring a downstream channel admission control profile:

```
cable ds-channel-admission-control-profile test1
class DsReserved reserved-bandwidth exclusive percent 5
class DsVoice reserved-bandwidth exclusive percent 6
class DsVoiceEM reserved-bandwidth exclusive percent 8
commit
```

The following is an example of downstream channel admission control profile settings:

```
show running-config cable ds-channel-admission-control-profile
cable ds-channel-admission-control-profile test_1
 class DsReserved
  reserved-bandwidth exclusive percent 5
 !
 class DsVoice
  reserved-bandwidth exclusive percent 6
 !
 class DsVoiceEm
  reserved-bandwidth exclusive percent 8
 !
cable ds-channel-admission-control-profile test_2
 class DsReserved
  reserved-bandwidth exclusive percent 15
 !
 class DsVoice
  reserved-bandwidth exclusive percent 16
 !
 class DsVoiceEm
  reserved-bandwidth exclusive percent 18
 !
```

Related information

cable ds-rf-port * down-channel * ds-channel-admission-control-profile
cable ds-rf-port * ofdm-channel * admission-control-modulation-profile
cable ds-rf-port * ofdm-channel * ds-channel-admission-control-profile

cable ds-phy-profile

Use the `cable ds-phy-profile` command to create or modify a docsis-phy-profile by entering a configuration mode to define the profile's J83 annex, QAM modulation constellation, and symbol rate. To delete a docsis-phy profile, or to restore the docsis-phy-profile to the factory defaults, use the **no** form of this command.

`cable ds-phy-profile` *ds-phy-prof-index*
`no cable ds-phy-profile` *ds-phy-prof-index*

The system enters the ds-phy-profile configuration mode prompt:

```
(ds-phy-prof ds-phy-template)
```

Syntax description

ds-phy-prof-index	You can specify up to four docsis-phy-profiles, using an integer range of 0-3.
`annex`	<enum: a | b | c> Default b Selects the ISO J83 standard annex that specifies the characteristics of the downstream RF signal. The choice of annex limits the valid settings of other attributes.
`[description]`	<string:1...255 characters> Optional Description of the profile.
`name`	<string:1...15> Mandatory Name for the profile for display purposes, which must be unique among all docsis-phy-profile configurations in the chassis.
`[modulation]`	<enum: qam64 | qam256> Default qam256 Selects the downstream RF QAM modulation constellation

`[interleaver]`	<enum: I8J16 | I12J17 | I16J8 | I32J4 | I64J2 | I128J1 | I128J2 | I128J3 | I128J4 | I128J5 | I128J6 | I128J7 | I128J8 > Mandatory Selects the downstream FEC interleaving combination of I and J for a down-channel. Per EuroDOCSIS standards, when the ds-phy-profile is configured with **Annex a**, the only valid configuration for this attribute is **I12J17**.
`symbol-rate`	Sets the symbol-rate for the channel. <decimal number, 5.0 .. 7.0>[5.360537].
`spectral-inversion`	Defines if spectral inversion is enabled or disabled for the channel. The default value is **disabled**.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

A docsis-phy-profile is a combination of downstream RF physical layer parameters. Each cable ds-rf-port down-channel refers to a docsis-phy-profile to specify its J83 annex, QAM modulation constellation, and symbol rate.

Examples

The following example creates four separate docsis-phy-profiles:

```
cable ds-phy-profile 0
cable ds-phy-profile 1
cable ds-phy-profile 2
cable ds-phy-profile 3
```

Related information

cable ds-rf-port

cable ds-rf-port

Use the `cable ds-rf-port` command to configure an individual ds-rf-port. To restore the ds-rf-port to its initial configuration of no template, admin-state down, use the **no** form of this command.

The commands for COS Core configuration are:

`cable ds-rf-port` *vchassis* `vslot/`*dsport*
`no cable ds-rf-port` *vchassis* `vslot/`*dsport*

The commands for NSG Pro configuration are:

`cable ds-rf-port` *ss:pp* `no cable ds-rf-port` *vss:pp*

After you have defined the port, you can configure it by referencing a ds-rf-port template. You can also, if necessary, override specific template parameters. For further details, see the *cable template ds-rf-port* command.

Syntax description

`slot`	<integer:0...5,8...13> slot number containing an 80G12 (DULC) card.
`port`	<integer:0...5> port number on the 80G12 card

Default

Command mode

Config mode.

Usage guidelines

The independent down-channel configurations of the COS Core and the NSG Pro may lead to different down-channel numbers for the same downstream frequency. A channel configuration conflict exists when both sides configure channels that overlap (either fully or partially) on a downstream channel frequency. Care should be taken to have the NSG Pro and COS Core configure the same frequencies for the same channel number; this is not enforced automatically.

Examples

The following example defines the ds-rf-port for port 0 of slot 9 on chassis 1 (COS Core configuration):

```
cable ds-rf-port 1:9/0
```

Related information

cable ds-phy-profile

cable template ds-rf-port

cable ds-rf-port * analog-overlay

cable ds-rf-port * analog-overlay

Use the `cable ds-rf-port analog-overlay` command to configure the Optical Receiver properly to provide a correct power level of the analog overlay path relative to RPD self-generated channels level..

`cable ds-rf-port` *vchassis vslot* `analog-overlay [ power-adjust-db` *power-adjust-db* `] [ input { enabled | disabled } ] [ ci { enabled | disabled } ] attenuation-db` *attenuation-db* `]`

Syntax description

vchassis	<integer:0...5,8...13> slot number containing an 80G12 (DULC) card.

vslot	<integer:0...5> port number on the 80G12 card
power-adjust-db	The power adjust in dB. The valid range is from -16.0 to 10.0, in steps of 0.1. The default value is 0.0.
`input`	The analog input admin state. The default value is **disabled**.
`ci`	The CI input admin state. The default value is **disabled**.
attenuation-db	The CI attenuation in dB. The valid range is from 0.0 to 30.0, in steps of 0.1. The default value is 0.0.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

Use this command together with the `cable ds-rf-port analog-overlay-channel-list` command.

Related information

cable ds-rf-port

cable ds-rf-port * analog-overlay-channel-list

cable ds-rf-port * analog-overlay-channel-list

Use the `cable ds-rf-port analog-overlay-channel-list` command to reflect the Optical Receiver analog overlay channel lineup.

`cable ds-rf-port` *vchassis vslot* `analog-overlay-channel-list` *analog-overlay-channel-set*

Syntax description

vchassis	<integer:0...5,8...13> slot number containing an 80G12 (DULC) card.
vslot	<integer:0...5> port number on the 80G12 card
analog-overlay-channel-set	The channels on the analog overlay path for the ds-rf-port, in a comma separated list,

Default

Entering the *analog-overlay-channel-set* as empty (a zero length string) reflects no channels on analog overlay path for the ds-rf-port.

Command mode

Config mode.

Usage guidelines

Each of the channels within this list must be configured under the *ds-rf-port * down-channel* to perfectly describe the analog overlay lineup. The per channel configuration must match the frequency and the relative level of the channel from the analog overlay path which is combined with RPD self-generated channels. Usually an analog (PAL/NTSC) channel over the analog overlay will be set to a relative level of +6dB, while a digital channel over the analog overlay will be set to a relative level of +0dB compared to the RPD self-generated digital channels.

The listed down-channels must not be assigned to any MAC domain or any video service group.

NOTE: Only the optical receiver lineup signal (a.k.a. Analog Overlay, AO) is relevant for this command and *down-channel* configurations, while the Channel Insertion (CI) input signal is not related.

IMPORTANT: For any changes to the configuration to take effect, you MUST reboot the RPD. For the specific options to which this applies, refer to the CableOS User Guide.

Examples

```
cable ds-rf-port 1:0 analog-overlay-channel-list 32-63,100,101
```

Related information

cable ds-rf-port * analog-overlay

cable ds-rf-port * channel-power-reference-width

Use the `cable ds-rf-port * channel-power-reference-width` command to configure the reference width for base channel power for a specific RPD.

`cable ds-rf-port` *vchassis vslot* `channel-power-reference-width` *channel-power-reference-width*

Syntax description

vchassis	<integer:0...5,8...13> the slot number of the card being configured.
vslot	<integer:0...5> the port number of the card being configured.

channel-power-reference-width	The reference width for base channel power. This is the assumed width of each SCQAM channel to which the **base-channel-power-db** set in the `cable template-ds-rf-port` command applies. The possible values are either 6mhz or 8mhz. There is no default value.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

This value can be set for the entire system using the `cable template-ds-rf-port` command. See the descriptions in the Syntax description for other usage guidelines.

Examples

The example below sets the reference width for base channel power to 6 mhz for the RPD at 1:0/0.

```
admin@CableOS(config)# cable ds-rf-port 1:0/0 channel-power-reference-width 6mhz
```

Related information

cable template ds-rf-port

cable ds-rf-port * down-channel

In either `cable ds-rf-port` or `cable template ds-rf-port` configuration mode, enter the following command to enter a sub-configuration mode to configure an individual SC-QAM channel:

`down-channel` *down-channel-index* `admin-state` *admin-state*

Example:

```
config)#  cable template ds-rf-port ds-
template
config-ds-rf-port-template)#  down-channel
 0
config-down-channel-0)
```

A ds-rf-port template may contain up to 158 SC-QAM down-channels.

To delete a down-channel, enter the following command in either `cable ds-rf-port` or `cable template ds-rf-port` configuration mode:

```
no down-channel down-channel-index
```

The CableOS Core rejects an attempt to delete a down-channel that is referenced by a ds-bonding-group or load-balancing group.

The CableOS Core forces the de-registration of non-bonded CMs registered on a deleted primary-capable down-channel.

Syntax description

`channel-index`	<integer:0...157> Channel index that uniquely identifies the channel on a ds-rf-port. The channel indices do not have to be contiguous or defined in order of frequency.
`[admin-state]`	<enum: up | down | testing> Default down Configured administrative state of the channel, corresponding to the SNMP adminStatus object for the channel interface. Setting this attribute to **up** enables operation of all video and DOCSIS functions. Setting this attribute to **down** configures the CableOS Core to not use the channel but still permits configuration of its other attributes. Setting it to **down** also forces the channel to mute its RF power as if **rf-mute** is configured. Setting this attribute to **testing** is to generate a continuous test wave on this QAM channel (pilot tone).
`[docsis-phy-profile]`	<integer: phy-index: 0..3> Refers to a "cable phy-profile ds-phy-prof-index" to define the RF parameters for the QAM modulation on this down-channel. You cannot assign a different `[docsis-phy-profile]` to a group of Quad adjacent down-channels (0-3, 4-7, … . Each QUAD must have the same `[docsis-phy-profile]`
`[ds-traffic-profile]`	qos-prof-name References a downstream traffic profile configured with "cable ds-traffic-profile ds-traf-prof-name". The referenced downstream traffic profile configures the operation of downstream QoS Classes for non-bonded service flows assigned to this down-channel.

`frequency-mhz`	<hz: 53.000..999.000, step 0.125 MHz> Mandatory, 3 digits after decimal point. Configured center frequency of the channel. The CableOS Core does not verify that the frequency matches any particular national channel plan. The CableOS Core rejects any configuration that attempts to assign overlapping frequencies on operational channels to reach the same cable modem service group (CM-SG). This includes any of the following configurations: • **cable ds-rf-port down-channel frequency-mhz** • **template ds-rf-port** (which can override all down-channel assignments to match the template) • **cable fiber-node** (which assigns a ds-rf-port to a fiber-node) • **cable ds-rf-port down-channel admin-state** (which can change a down-channel to operational) • **cable ds-rf-port admin-state up** (which can change all down-channels on a ds-rf-port to operationally **up**). The 80G12 (DULC) rejects an attempt by the CableOS Core to configure a DOCSIS downstream channel at a frequency that overlaps a video channel configured on the NSG Pro.
`[power-adjust-db]`	dBTenths: -6.0 to 0.0, Default 0.0, units 0.1 dB. • Adjustment to decrease this channel's output power. The 80G12 (DULC) accepts this adjustment as configured by the CableOS Core. Valid ranges: • For admin up: -6.0 .. 0.0 • For admin down or testing: -50.0 .. 9.0>[0.0]
`[provisioned-attr-mask]`	<bits: bitname [bitname]…> (quoted string containing space-separated bitnames) Default "" where **bitname** is one of bonded, low-latency, high-availability, reserved-3, reserved-4, … reserved-15, operator-16, operator-17, … operator-31.
`[qam-alias]`	<quoted-string: 0..16> Default "" This attribute represents the name of the QAM channel and is presented as the ifAlias reported object in the if-MIB. The ifAlias object is a non-volatile human-readable name assigned by an SNMP manager.

`[up-down-trap]`	<enum: enabled | disabled> Default disabled Enables the **linkUp** and **linkDown** SNMP traps for this channel interface.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

IMPORTANT: For any changes to the QAM Count in this configuration to take effect, you MUST reboot the RPD.

cable ds-rf-port * down-channel * ds-channel-admission-control-profile

Use the `cable ds-rf-port * down-channel * ds-channel-admission-control-profile` command to select a named profile to set the downstream bandwidth thresholds for Data, Voice, and Voice Emergency for a specific SC-QAM downstream channel.

`cable ds-rf-port` [*VC* | *VS* | *P*] `down-channel` [*chl*] `ds-channel-admission-control-profile` [*profile name*]

Syntax description

VC/ VS/ P	Specifies the downstream port number.
chl	Specifies the physical downstream channel.
profile-name	The downstream channel admission control profile name.

Default

A profile with the name *default* always exists and if a profile name is not specified in the CLI command this profile will be used.

Command mode

Exec mode.

Usage guidelines

The `ds-channel-admission-control-profile` is applied per channel under RF port.

Examples

The following is an example of a downstream channel admission control profile selection:

```
admin@CableOS(config)# cable ds-rf-port 1:1/9 down-channel 0 ds-channel-admission-
control-profile ds_profile
```

Related information

cable ds-channel-admission-control-profile

cable ds-rf-port * ofdm-channel * admission-control-modulation-profile

cable ds-rf-port * ofdm-channel * ds-channel-admission-control-profile

cable ds-rf-port * leakage-signal * signal type

This command sets the RF leakage detection signal ID emitted by the designated DS RF port and enters a sub-configuration mode that allows setting the RF-sniffer vendor and the RF leakage detection signal parameters specific to that vendor.

```
leakage-signal {1 | 2}
```

Syntax description

`leakage-signal`	The command to set the RF leakage detection signal ID Range: 1, 2

Example:

```
a@CableOS(config-ds-rf-port 3:0/0 -)#  leakage signal 1
```

```
signal type {arcom | comsonics | trilithic | effigis | single_tone}
```

Syntax description

`signal type`	The command to set the vendor Range: • arcom = Arcom • comsonics = ComSonics • trilithic = VIAVI Trilithic • effigis = Effigis • single_tone = High Precision CW

Example:

```
a@CableOS(leakage-signal-1)# signal type arcom
```

Arcom

`center-frequency` *center frequency value*

`code {1 | 2 | 3 | 4}`

`power-adjust` *power adjust value*

Syntax description

center frequency	The command to designate the center frequency of the RF leakage detection signal
center frequency value	The center frequency in Hz Range: 108000000–1218000000 (108 MHz–1218 MHz) Default = current setting

code	The command that sets the ±5 KHz offset Range: **1** = Carrier 1 +5 KHz offset; Carrier 2 +5 KHz offset **2** = Carrier 1 −5 KHz offset; Carrier 2 −5 KHz offset **3** = Carrier 1 +5 KHz offset; Carrier 2 −5 KHz offset **4** = Carrier 1 −5 KHz offset; Carrier 2 +5 KHz offset

power-adjust	The command to set the power adjustment (amplitude) in relation to the adjacent QAM channel
power adjust value	The power (amplitude) adjustment in dB: Power level per carrier: −30 dBc relative to SC-QAM digital channel power Default = 0 dB

Example:

```
a@CableOS(leakage-signal-1)# center-frequency 200000000

a@CableOS(leakage-signal-1)# code 1

a@CableOS(leakage-signal-1)# power-adjust 1 or -1
```

ComSonics

Frequency band and marker ID matrix table for ComSonics configuration:

Frequency band	Marker ID #1	Marker ID #2	Marker ID #3
Band 1 (138 MHz) CW carrier separation Low band	2262 Hz	2864 Hz	3618 Hz

Frequency band	**Marker ID #1**	**Marker ID #2**	**Marker ID #3**
Band 2 (612 MHz) CW carrier separation Mid band	2566 Hz	3022 Hz	3326 Hz
Band 3 (774 MHz) CW carrier separation High band	2566 Hz	3022 Hz	3326 Hz

`center-frequency` *center frequency value*

`frequency-band` { `low-band` | `mid-band` | `high-band` }

`marker-id` { `1` | `2` | `3` }

`power-adjust` *power adjust value*

Syntax description

center frequency	The command to designate the center frequency of the RF leakage detection signal
center frequency value	The center frequency in Hz Range: 108000000–1218000000 (108 MHz–1218 MHz) Default = current setting

frequency-band	The command that sets the frequency band (see the table above) Range: • low-band • mid-band • high-band

marker-id	The command that sets the marker ID (see the above table) Range: 1, 2, 3

power-adjust	The command to set the power adjustment (amplitude) in relation to the adjacent QAM channel

power adjust value	The power (amplitude) adjustment in dB: Power level per carrier: −30 dBc relative to SC-QAM digital channel power Default = 0 dB

Example:

```
a@CableOS(leakage-signal-1)# center-frequency 612000000

a@CableOS(leakage-signal-1)# frequency-band mid-band

a@CableOS(leakage-signal-1)# marker-id 1

a@CableOS(leakage-signal-1)# power-adjust 1 or -1
```

VIAVI Trilithic

Frequency separations and their CLI syntax (code) Marker IDs for Trilithic configuration:

Frequency separation	Marker ID
156.25 Hz	1
312.50 Hz	3
468.75 Hz	4
625.00 Hz	2
781.25 Hz	5
937.50 Hz	6
1093.75 Hz	7
1250.00 Hz	8

`center-frequency` *center frequency value*

`marker-id {1 | 2 | 3 | 4 | 5 | 6 | 7 | 8}`

`power-adjust` *power adjust value*

Syntax description

center frequency	The command to designate the center frequency of the RF leakage detection signal

center frequency value	The center frequency in Hz Range: 108000000–1218000000 (108 MHz–1218 MHz) Default = current setting

marker-id	The command that sets the CLI syntax aliases, each for a frequency separation (see the above table) Range: 1, 2, 3, 4, 5, 6, 7, 8

power-adjust	The command to set the power adjustment (amplitude) in relation to the adjacent QAM channel
power adjust value	The power (amplitude) adjustment in dB: Power level per carrier: −30 dBc relative to SC-QAM digital channel power Default = 0 dB

Example:

```
a@CableOS(leakage-signal-1)# center-frequency 200000000

a@CableOS(leakage-signal-1)# marker-id 3

a@CableOS(leakage-signal-1)# power-adjust 1 or -1
```

Effigis

`center-frequency` *center frequency value*

`marker-delta` *marker delta value*

`power-adjust` *power adjust value*

Syntax description

center frequency	The command to designate the center frequency of the RF leakage detection signal
center frequency value	The center frequency in Hz Range: 108000000–1218000000 (108 MHz–1218 MHz) Default = current setting

marker-delta	The command to designate the delta on each side of the center frequency signal

marker delta value	The marker delta in Hz Range: 3480–7000

power-adjust	The command to set the power adjustment (amplitude) in relation to the adjacent QAM channel
power adjust value	The power (amplitude) adjustment in dB: Power level per carrier: −30 dBc relative to SC-QAM digital channel power Default = 0 dB

Example:

```
a@CableOS(leakage-signal-1)# center-frequency 200000000

a@CableOS(leakage-signal-1)# marker-delta 3645

a@CableOS(leakage-signal-1)# power-adjust 1 or -1
```

single_tone

"single_tone" is a special leakage-tone type for Single high precision CW. This signal-type generates a single pilot in the frequencies range from 108MHz to 1.218GHz and with power-adjust from -12 to 36db.

`center-frequency` *center frequency value*

`power-adjust` *power adjust value*

Syntax description

center frequency	The command to designate the CW center frequency of the RF leakage detection signal
center frequency value	The center frequency in Hz Range: 108000000 - 1218000000 (108 MHz - 1218 MHz)

power-adjust	The command to set the power adjustment (amplitude) in relation to the adjacent QAM channel
power adjust value	The power (amplitude) adjustment in dB: Range: -12 dBm - 36 dBm

Example:

```
admin@CableOS(config)#cable ds-rf-port 2:0/0 leakage-signal 1 signal-type
 single_tone center-frequency 20000000 power-adjust -6
```

To remove single high precision CW, use the following:

```
admin@CableOS(config)# no cable ds-rf-port 2:0/0 leakage-signal 1
```

Default

See the descriptions in the **Syntax description** tables for default values.

Command mode

Config mode.

Usage guidelines

After setting the DS RF port that emits the RF leakage detection signal, you set the signal ID (1 or 2) and then the vendor. Setting the vendor sets the set of CLI commands for configuring the signal for that vendor only until the vendor is changed; CLI commands relevant to other vendors are disabled.

For more information, refer to the CableOS User Guide.

Examples

See examples in the Syntax Descriptions.

cable ds-rf-port * ofdm-channel

In either cable ds-rf-port or cable template ds-rf-port configuration mode, enter the following command to enter a sub-configuration mode to configure an individual OFDM channel:

`ofdm-channel` *ofdm-channel-index*

Example:

```
config)#  cable template ds-rf-port ds-template
config-ds-rf-port-template)#  ofdm-channel 0
config-ofdm-channel-0)#
```

A ds-rf-port template may contain up to 256 ofdm-channels.

To delete an ofdm-channel, enter the following command in either **cable ds-rf-port** or **cable template ds-rf-port** configuration mode:

```
no ofdm-channel ofdm-channel-index
```

Syntax description

`channel-index`	<0...255> OFDM channel identifier, which is identified within the cable modem by a Receive OFDM Channel Index; the index of an OFDM Channel to which the whole Receive OFDM Channel encoding refers.

`[admin-state]`	<enum: up | down> Default up Administrative state of the OFDM channel where **down** means that the channel has been turned off; **up** is the default state.
`auto-profile-change`	<enabled | disabled> Default enabled When `auto-profile-change` is enabled, CableOS sets the optimal profile per Cable Modem based on RxMER and CM-Status messages. For more information refer to the *CableOS User Guide* section **Configuring automatic changing of OFDM modulation profiles**.
`default-profile`	The default profile to be used when the `auto-profile-change` is disabled.
`[cyclic-prefix]`	0 = 0.9375 μs with 192 samples 1 = 1.25 μs with 256 samples 2 = 2.5 μs with 512 samples (this is the default value) 3 = 3.75 μs with 768 samples 4 = 5.0 μs with 1024 samples Specifies the five possible values for the number of samples in a downstream Cyclic Prefix (Ncp) for mitigating interference due to micro-reflections; larger micro-reflections require longer CP at the cost of PHY capacity loss. The Cyclic Prefix (in microseconds) is converted into samples using the sample rate of 204.8 Msamples/s and is an integer multiple of: 1/64 * 20 μs.
`[lower-bdry-freq]`	Starting DS (downstream) frequency: • 54 MHz • 85 MHz • 108 MHz • 258 MHz
`[lower-guard-band-index]`	<0 or 1 MHz...177 MHz> Instantiates a list of guard band widths that can be associated with the lower guard bands defined for an OFDM channel.

`[pilot-scale-factor]`	Range: 120 > M > 48 where 48 is a typical value for M This attribute indicates the scale factor for calculating the number of continuous pilots. More pilots increase robustness to some channel impairments at the expense of capacity. The default value is 48.
`[plc-blk-freq]`	User-defined PHY Link Channel (PLC) block frequency, which is the center frequency of the lowest sub-carrier of the 6 MHz encompassed spectrum containing the PLC at its center. The frequency of this sub-carrier is required to be located on a 1 MHz grid. The aim of the PLC is for the CMTS to convey to the cable modem the physical properties of the OFDM channel. When present, this TLV tells the CM where to look for the PLC of the OFDM channel to which it will move.
`[rolloff-period]`	Range: • 0 = 0 µs with 0 samples • 1 = 0.3125 µs with 64 samples • 2 = 0.625 µs with 128 samples (this is the default period) • 3 = 0.9375 µs with 192 samples • 4 = 1.25 µs with 256 samples Rolloff period OFDM windowing type that specifies the allowed values for applying windowing to maximize the capacity of the downstream channel. A larger rolloff period provides sharper edges in the spectrum, which: • Enables more capacity as the channel emits less noise into the neighboring channels • Allows channels to be allocated closer in frequency A larger rolloff period reduces the efficiency of the Cyclic Prefix (CP) functionality that protects against micro-reflections. Thus, the CMTS **must not** allow a configuration in which the rolloff period value equals or exceeds the CP value.

`[subcarrier-spacing]`	Range: 25 kHz, 50 kHz Defines the sub-carrier spacing configured on the OFDM downstream channel: • If the sub-carrierSpacing is 50 kHz, then the FFT length is 4K • If the sub-carrierSpacing is 25 kHz, then the FFT length is 8K In addition, consider the following: • 8K FFT is much more sensitive to phase noise (close-in side band frequency) • 4K FFT imposes lower PHY latency • 8K FFT is more robust to micro-reflection intense channels • 8K FFT is more efficient in terms of required Cyclic Prefix (CP) overhead to mitigate micro-reflections • 8K FFT is more efficient in terms of band-edge loss • 8K FFT provides twice the frequency selectivity (bit loading frequency resolution)
`[time-interleaver-depth]`	<0...32> (integer) The number of samples for the OFDM downstream channel, limited to: • 32 samples for 50 kHz sub-carrierSpacing (20 µs symbol time) • 16 samples for 25 kHz sub-carrierSpacing (40 µs symbol time) (this is the default value) A larger time interleaver depth increases the receiver resilience to impulse noise at the expense of additional PHY latency (up to the order of 20u*32=40u*16=640 µs, not taking Cyclic Prefix (CP) into account)
`[upper-bdry-freq]`	Ending DS (downstream) frequency: • 1.2 GHz
`[upper-guard-band-index]`	<0 or 1 MHz...177 MHz> Instantiates a list of guard band widths that can be associated with the upper guard bands defined for an OFDM channel.
`[query-period-sec]`	Cable Modems report Rx MER vector (MER per subcarrier) using an OPT-RSP message following an OPT-REQ from CableOS. The periodicy of the automatic profile selection is set through the `query-period-sec` parameter. The default value is 100 seconds.

`[unfit-profile-mins]`	OFDM profiles marked as unused are not considered by the algorithm that chooses the channel to be used. A profile is marked as unused for a CM following a CM event code **16** for that profile. A profile is deleted from the unused-list following a CM event code **24** for that profile or if the `[unfit-profile-mins]` time has elapsed. If `[unfit-profile-mins]` is set to 0, a profile is deleted from the unused list only following a CM event code **24** for that profile. The default value is 10 minutes.
`power-adjust-db`	< -16.0 to 10.0 dB>, default value is 0.0 The adjustments to the channel power in steps of 0.1dB
`rf-mute`	<enabled | disabled> Default disabled Enable/disable RF power output.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

See the descriptions in the *Syntax description* for usage guidelines.

cable ds-rf-port * ofdm-channel * admission-control-modulation-profile

Use the `cable ds-rf-port * ofdm-channel * admission-control modulation-profile` command to select a named profile that will be used for admission control calculation purposes for a specific downstream OFDM channel.

```
cable ds-rf-port [VC | VS | P] ofdm-channel [chl] admission-control
modulation-profile [profile name]
```

Syntax description

`VC/ VS/ P`	Specifies the downstream port number.
`chl`	Specifies the OFDM channel.
`profile-name`	The downstream channel admission control modulation profile name.

Command mode

Exec mode.

Usage guidelines

This command selects the modulation profile to be used for admission control calculations.

Using a higher modulation uses less channel percentage for any given bitrate and allows more overall bitrate to be admitted.

If lower modulations are used, the admitted bitrate may no longer be guaranteed.

Using a lower modulation is more conservative but may allow less bitrate to be committed.

Examples

The following is an example of a downstream channel admission control profile selection:

```
admin@CableOS(config)# cable ds-rf-port 1:1/9 ofdm-channel 0 admission-control
 modulation-profile A
```

Related information

cable ds-rf-port * ofdm-channel ofdm-profile

cable ds-channel-admission-control-profile

cable ds-rf-port * down-channel * ds-channel-admission-control-profile

cable ds-rf-port * ofdm-channel * ds-channel-admission-control-profile

cable ds-rf-port * ofdm-channel * ds-channel-admission-control-profile

Use the `cable ds-rf-port * ofdm-channel * ds-channel-admission-control-profile` command to select a named profile to set the downstream bandwidth thresholds for Data, Voice, and Voice Emergency for a specific OFDM downstream channel.

`ds-rf-port` *[VC | VS | P]* `ofdm-channel` *[chl]* `ds-channel-admission-control-profile` *[profile-name]*

Syntax description

VC/ VS/ P	Specifies the downstream port number.
chl	Specifies the OFDM channel.
profile-name	The downstream OFDM channel admission control profile name.

Default

A profile with the name *default* always exists and if a profile name is not specified in the CLI command this profile will be used.

Command mode

Exec mode.

Usage guidelines

The `ds-channel-admission-control-profile` is applied per channel under RF port.

Examples

The following is an example of a downstream OFDM modulation profile selection:

```
admin@CableOS(config)# cable ds-rf-port 1:0/0 ofdm-channel 0 ds-channel-admission-
control-modulation-profile ds_profile
```

Related information

cable ds-channel-admission-control-profile

cable ds-rf-port * down-channel * ds-channel-admission-control-profile

cable ds-rf-port * ofdm-channel * admission-control-modulation-profile

cable ds-rf-port * ofdm-channel ofdm-profile

From the cable ds-rf-port ofdm-channel or cable template ds-rf-port ofdm-channel configuration mode, enter the following command to enter a sub-configuration mode to configure the OFDM profile parameters of an individual SC-QAM channel:

`ofdm-profile`

Example:

```
config)#  cable template ds-rf-port ds-
template
config-ds-rf-port-template)#  ofdm-channel ofdm-profile
```

Syntax description

`ofdm-profile-index`	<0...16 | 255> This attribute is a key defined to provide an index into the table. The NCP profile has an assigned Profile Id of 255.
`{default-modulation]`	<qpsk(3) | qam16(4) | qam64(5) | qam128(6) | qam256(7) | qam512(8) | qam1024(9) | qam2048(10) | qam4096(11)> Defines the default bit loading applied to sub-carriers in the OFDM downstream channel. If a sub-carrier is not configured with a specific modulation order, it will use this value. The CCAP MUST reject a modulationDefault value of **zeroBitLoaded(2)**. If ProfileId is 255 (the NCP profile), the CCAP MUST also reject any modulation Default values other than **qpsk(3)**, q**am16(4)**, or **qam64(5)**.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

A downstream OFDM profile defines the modulation order or bit loading, on each carrier, in order to account for varying downstream plant conditions across different devices.

cable ds-rf-port * ofdm-exclusion-block-mhz

From the cable ds-rf-port ofdm-channel or cable template ds-rf-port configuration mode, enter the following command to define a sub-carrier that cannot be used for OFDM because another type of service is using the sub-carrier's frequency or because a permanent ingress is present on the frequency:

`ofdm-exclusion-block-mhz` *start-frequency end-frequency*

Syntax description

`start-frequency`	User-defined The lower limit of the frequency block to exclude OFDM
`end-frequency`	User-defined The upper limit of the frequency block to exclude OFDM

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

A downstream OFDM profile defines the modulation order or bit loading, on each carrier, in order to account for varying downstream plant conditions across different devices.

cable ds-rf-port * tilt-pivot-freq-mhz

Use the cable ds-rf-port * tilt-pivot-freq-mhz command to configure the frequency of the tilt pivot point.

`cable ds-rf-port` *vchassis vslot* `tilt-pivot-freq-mhz` *tilt-pivot-frequency*

To remove this configuration, use the **no** form of the command:

`no cable ds-rf-port` *vchassis vslot* `tilt-pivot-freq-mhz`

Syntax description

vchassis	<integer:0...5,8...13> the slot number of the card being configured.
vslot	<integer:0...5> the port number of the card being configured.
tilt-pivot-frequency	The frequency of the tilt pivot point in MHz. Enter a decimal number in the range 1002.0 … 1218.0

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

This value of this optional attribute configures the frequency of the tilt pivot point (TLV 61.6). The tilt pivot point is the maximum frequency point where the Tilt Slope is applicable. If this attribute is not defined, the R-PHY uses its default tilt-pivot-frequency.

If you use the `no tilt-pivot-freq-mhz` format to remove the configuration, you must then reboot the RPD for the change to be applied.

NOTE: This command is supported for Ripple-1, Reef, and Wave-1 only.

Examples

This example sets the frequency of the tilt pivot point of RPD 5:0 to be 1201.5 MHz.

```
cable ds-rf-port 5:0 tilt-pivot-freq-mhz 1201.5
```

cable ds-rf-port oob-channel

Use the `cable ds-rf-port oob-channel` command to configure the SCTE-55-1 OOB channel sub-menu.

`cable ds-rf-port` *vc:vs/pp* `oob-channel` *oob-channel-id*

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
pp	Specifies the port number
oob-channel-id	Specifies the channel ID. The valid range is from 0 - 2.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

IMPORTANT: If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines channel 0 as the SCTE-55-1 channel sub menu for chassis 1, slot 0, port 0.

```
cable ds-rf-port 1:0/0 oob-channel 0
```

Related information

cable ds-rf-port oob-channel frequency-mhz
cable ds-rf-port oob-channel oob-core-id
cable ds-rf-port oob-channel type
cable oob-core
cable proto-throttle
cable oob-core mc-dst-ip
cable oob-core src-ip

cable ds-rf-port oob-channel bandwidth-mhz

Use the `cable ds-rf-port oob-channel bandwidth-mhz` command to define the downstream channel bandwidth.

`cable ds-rf-port` *vc:vs/pp* `oob-channel` *oob-channel-id* `bandwidth-mhz` *bandwidth*

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
pp	Specifies the port number
oob-channel-id	Specifies the channel ID. The valid range is from 0 - 2.
bandwidth	Specifies the bandwidth for the 55-1 channel. The valid options are 1.28 2.56 5.12 25.6.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

❗ **IMPORTANT:** If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines the bandwidth for channel 0 of chassis 1, slot 0, port 0 as 25.6.

```
cable ds-rf-port 1:0/0 oob-channel 0 bandwidth-mhz 25.6
```

Related information

cable ds-rf-port oob-channel
cable ds-rf-port oob-channel oob-core-id
cable ds-rf-port oob-channel type
cable oob-core
cable proto-throttle
cable oob-core mc-dst-ip
cable oob-core src-ip

cable ds-rf-port oob-channel frequency-mhz

Use the `cable ds-rf-port oob-channel frequency-mhz` command to define the downstream channel frequency.

`cable ds-rf-port` *vc:vs/pp* `oob-channel` *oob-channel-id* `frequency-mhz` *freq*

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
pp	Specifies the port number
oob-channel-id	Specifies the channel ID. The valid range is from 0 - 2.
freq	Specifies the Downstream center frequency for 55-1 channel. The RPD QPSK modulates the OOB stream and transmits it via RF at the appropriate frequency on the specified downstream RF ports.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

! **IMPORTANT:** If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines the frequency for channel 0 of chassis 1, slot 0, port 0 as 91.5.

```
cable ds-rf-port 1:0/0 oob-channel 0 frequency-mhz 91.5
```

Related information

cable ds-rf-port oob-channel
cable ds-rf-port oob-channel oob-core-id
cable ds-rf-port oob-channel type
cable oob-core
cable proto-throttle
cable oob-core mc-dst-ip
cable oob-core src-ip

cable ds-rf-port oob-channel oob-core-id

Use the `cable ds-rf-port oob-channel oob-core-id` command to define the downstream channel core-id to be used.

`cable ds-rf-port` *vc:vs/pp* `oob-channel` *oob-channel-id* `oob-core-id` *core-id*

Syntax description

`vc`	Specifies the CableOS Virtual Chassis
`vs`	Specifies the CableOS Virtual Slot
`pp`	Specifies the port number
`oob-channel-id`	Specifies the channel ID. The valid range is from 0 - 2.
`core-id`	Specifies to the downstream OOB destination ID configured under cable oob-core. The valid range is 0-255

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

IMPORTANT: If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines the destination core ID for channel 0 of chassis 1, slot 0, port 0 as 0.

```
cable ds-rf-port 1:0/0 oob-channel 0 oob-core-id 0
```

Related information

cable ds-rf-port oob-channel
cable ds-rf-port oob-channel frequency-mhz
cable ds-rf-port oob-channel type
cable oob-core
cable proto-throttle
cable oob-core mc-dst-ip
cable oob-core src-ip

cable ds-rf-port oob-channel type

Use the `cable ds-rf-port oob-channel type` command to define the type of OOB channel to be configured.

`cable ds-rf-port` *vc:vs/pp* `oob-channel` *oob-channel-id* `type` *type*

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
pp	Specifies the port number
oob-channel-id	Specifies the channel ID. The valid range is from 0 - 2.
type	Specifies the OOB type. The valid values are: • 55-1 (Arris/Motorola) • ndf
Additional fields when the OOB type is 55-1 (The second field allows the option to split the signal to two different frequencies):	
	second-admin-state: Administrative State of the OOB channel for second frequency [default up]
	second-frequency-mhz: OOB channel second frequency

	second-power-gain: Power gain of the OOB channel for second frequency in dB [default 0.0]
	second-rf-mute: rf-mute of the OOB channel for second frequency [default disabled]

Default

The default channel type is 55-1 (Arris/Motorola).

Command mode

Config mode.

Usage guidelines

! **IMPORTANT:** For any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines channel 0 of chassis 1, slot 0, port 0 as being of type 55-1.

```
cable ds-rf-port 1:0/0 oob-channel 0 type 55-1
```

Related information

cable ds-rf-port oob-channel
cable ds-rf-port oob-channel frequency-mhz
cable ds-rf-port oob-channel oob-core-id
cable oob-core
cable proto-throttle
cable oob-core mc-dst-ip
cable oob-core src-ip

cable ds-traffic-profile

Use the `cable ds-traffic-profile` command to configure a Downstream QoS profile. To delete an existing Downstream QoS profile, use the **no** form of this command.

`cable ds` *qos-prof-name*
`no cable ds-traffic-profile` *qos-prof-name*

After entering the `cable ds-traffic-profile` command, you can then enter additional configuration parameters using the following commands:

`reserved-bandwidth` {`kbps` *kbps* | `percent` *percent*}

[`concurrent-percent` *percent*]

[`class-rate-limit` {`none` | `kbps` *kbps* | `percent` *percent*}]

[`flow-queue-limit-msec` *milliseconds*]

[`assumed-packet-bytes` *bytes*]

[`ds-traffic-priority` *traf-priority* `ds-flow-weight` *weight* `ds-qos-class` *ds-qc-name*]

Only the reserved-bandwidth parameter is mandatory.

Syntax description

`qos-prof-name`	<string length 1..12> The name of a downstream QoS profile. The CableOS Manager supports up to 16 separate downstream QoS profiles.

`reserved-bandwidth`
`{ kbps kbps`
`percent percent }`
	Mandatory
	Configures the minimum bandwidth reserved for use by all flows of the ds-qos-class on an RF channel assigned to this ds-traffic-profile. The reservation may be made either as an absolute value with kbps *kbps* or as a relative fraction of the total RF Capacity of the DCS referencing the profile with percent *percent*.
	In addition, admission of Service Flows with Minimum Reserved Rate is controlled so as to not exceed the reserved-bandwidth of any channel used by the service flow.
	kbps is in units of 1000 bits/sec of CPE Ethernet bytes, that is, from start of Destination Address to end of CRC, and does not include DOCSIS or physical layer overhead.
	percent is the minimum percentage of channel RF capacity reserved for the qos-class. The percent value is given with a range of 0.0. to 100.0 percent, with a granularity of 0.1 percent. RF capacity includes the physical layer overhead and a DOCSIS header for each packet of size assumed-packet-bytes.

`[ concurrent-percent percent ]`	Optional, Decimal <0..100> A percentage of each flow's Minimum Reserved Traffic Rate (TLV 25.10) assumed to be concurrently admitted. If omitted, assumed to be 100% for DsVoice/DsVoiceEm or 0% for all other QoS Classes.

`[ class-rate-limit`
`{ none | kpbs kbps`
`| percent percent } ]`
	Optional, defaults to none if omitted.
	Sets a maximum rate for the aggregate of all flows mapped to this QoS Class on a channel assigned to this ds-traffic-profile. This is helpful to limit the burstiness of IP video in the DsMulticast class.
	kbps is in units of 1000 bits/sec of the Ethernet bytes of a packet. percent is a fraction of RF capacity.

`[ flow-queue-limit-msec milliseconds ]`	Optional, <milliseconds: 1..200, default 50> Number of milliseconds to enqueue maximum length (1500-byte) Ethernet packets on the flow at its Maximum Sustained Traffic Rate (TLV 25.8). Limits the number of packets enqueued for any single flow.
`[assumed-packet-bytes bytes ]`	Optional, default is 218 for DsVoice/DsVoiceEM (G.711 20 msec) and 512 bytes for all other QCs The default assumed size of the average packet of the flow when calculating per-packet overhead for admission control based on RF capacity percent.
`[ ds-traffic-priority traf-priority ds-flow-weight weight [ ds-qos-class ds-qc-name ] ]`	Optional, the default is: • ds-traffic-priority 0 ds-flow-weight 10 • ds-traffic-priority 1 ds-flow-weight 20 • ds-traffic-priority 2 ds-flow-weight 30 • ds-traffic-priority 3 ds-flow-weight 40 • ds-traffic-priority 4 ds-flow-weight 50 • ds-traffic-priority 5 ds-flow-weight 60 • ds-traffic-priority 6 ds-flow-weight 70 • ds-traffic-priority 7 ds-flow-weight 80 Within ds-traffic-profile configuration mode, enter up to eight configuration lines for traf-priority 0..7 to configure operation of the DOCSIS traffic priority traf-priority: ds-traffic-priority *traf-priority* ds-flow-weight *weight* [ds-qos-class *ds-qc-name*]] traf-priority, Integer 0..7. Corresponds to the Traffic Priority (TLV 25.7) configuration setting of a service flow. ds-flow-weight, Mandatory Integer 0..100. A dimensionless weight for scheduling bandwidth for a flow relative to other flows in the same ds-qos-class. ds-qos-class ds-qc-name, optional. Specifies that service flows with a Traffic Priority TLV set to traf-priority be explicitly classified to the named ds-qos-class rather than using the default DS QoS Class assignment algorithm of the CableOS Core.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

See the descriptions in the Syntax description for usage guidelines.

Examples

To delete an existing Downstream QoS profile, enter the command:

```
no cable ds-traffic-profile qos-prof-name
```

In Downstream QoS profile configuration mode, enter the following to configure the operation of a single ds-qos-class for the profile:

```
(ds-qos-prof qos-prof-name)# ds-qos-class ds-qc-name
```

This enters “Downstream QoS Profile Class” configuration sub-mode with the prompt:

```
(ds-qos-prof qos-prof-name ds-qc-name)#
```

To remove the configuration for a single ds-qos-class from a ds-traffic-profile, enter the following in Downstream QoS Profile configuration mode:

```
(ds-qos-prof qos-prof-name ds-qc-name)# no ds-qos-class ds-qc-name
```

cable dsg cfr

Use the `cable dsg cfr` command to define and enable Advanced-Mode DOCSIS Set-Top Gateway (A-DSG) classifiers on Ripple1. To remove one or more specified A-DSG classifiers use the **no** form of this command. To disable one or more specified A-DSG classifiers but retain their configuration, use the **disabled** form of this command.

`cable dsg cfr` *cfr-index* `dest_ip` *dest-ip*
`no cable dsg cfr` *cfr-index* `dest_ip` *dest-ip*
`cable dsg cfr` *cfr-index* `dest_ip` *dest-ip* `disabled`

After entering the `cable dsg cfr` command (including the *cfr-index* and *dest-ip*), you can then define these optional configuration parameters:

`[ tunnel` *tunnel-index* `] [ dest-port` *start end* `[ priority` *priority* `] [ src-ip` *src-ip* `src-prefix-len` *length* `] [{enabled | disabled}]`
`[ in-dcd {yes | no}]`

Syntax description

cfr *cfr-index*	Mandatory DSG Classifier index
dest_ip *dest-ip*	Mandatory Destination IP address of the **multicast** session classified into DSG tunnel

[tunnel *tunnel-index*]	DSG tunnel ID
[dest-port *start end*]	TLV 23.9.9(10) Destination TCP/UDP Port Start(End) port
[priority *priority*]	Default: 0 TLV 23.5 Classifier Priority
[src-ip *src-ip* src-prefix-len *length*]	src-ip is the TLV 23.9.3 Source IP Address (unicast) src-prefix-len length is converted into TLV 23.9.4 Source IP Mask
`[enabled | disabled]`	Default: **enabled** • enabled: Enables one or more specified A-DSG classifiers • disabled: Disables one or more specified A-DSG classifiers but retains their configuration
`[in-dcd {yes | no}]`	Default: **yes** • yes: Include classifier in the DOCSIS DCD MMM • no: Do not include classifier in the DOCSIS DCD MMM

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

DSG classifiers specify which traffic should be mapped to the DSG tunnel. Each tunnel can have many classifiers.

Example

```
cable dsg cfr 100
tunnel         10
dest-ip        238.20.30.40
dest-port 0 65535
priority       1
src-ip         13.13.51.34
src-prefix-len 32
  enabled
in-dcd         yes
!
```

cable dsg client-list

Use `cable dsg client-list` to configure the client parameters and the associated DSG rule for Advanced-mode DOCSIS Set-Top Gateway (A-DSG). To remove this configuration, use the **no** form of the command, either for all client lists or for a specific client.

```
cable dsg client-list client-list-id id-index client-id application-id app-id ca-system-id
sys-id mac-addr mac-addr broadcast [ broadcast-id ] vendor-param  param-list-id
no cable dsg client-list client-list-id
no cable dsg client-list client-list-id id-index client-id
```

After entering the `cable dsg client-list` command (including the *client-list-id and client-id*), you must then enter one of the following additional configuration parameters:

```
application-id app-id ca-system-id sys-id mac-addr  mac-addr broadcast [ broadcast-id]
vendor-param param-list-id
```

Syntax description

client-list *client-list-id*	Mandatory DSG client list ID
id-index *client-id*	Mandatory DSG client ID
application-id *app-id*	Hexadecimal TLV 50.4.4 Application ID
ca-system-id *sys-id*	Hexadecimal TLV 50.4.3 CA System ID
mac-addr *mac-addr*	TLV 50.4.2 DSG Well-Known MAC Address
broadcast [*broadcast-id*]	TLV 50.4.1 DSG Broadcast
vendor-param *param-list-id*	The ID of the Vendor parameter list to be used.

Default

There are no default values for this command.

Command mode

Config mode.

Usage guidelines

In DSG Advanced Mode, the DSG Tunnel Address is determined dynamically by an entry in the DSG Address Table. The DSG Address Table is located in the DOCSIS MAC Management Message called Downstream Channel Descriptor (DCD). The DSG Address Table is indexed by the DSG Client with its DSG Client ID.

Example

```
cable dsg client-list 2
id-index 1
  ca-system-id 700
!
!
```

cable dsg tg

Use `cable dsg tg` to associate a group of Advanced-Mode DOCSIS Set-Top Gateway (A-DSG) tunnels to one or more downstream interfaces. To remove this configuration, use the **no** form of this command.

`cable dsg tg` *group-id* `[ { enabled | disabled } ]`
`no cable dsg tg` *group-id*

After entering the `cable dsg tg` command (including *group-id*), you can then define these optional configuration parameters:

`[ priority` *priority* `] [ enabled ]`
`[ vendor-param` *vendor-group-id* `]`

Syntax description

group-id	Mandatory DSG tunnel group ID
[priority *priority*]	TLV 50.2 DSG Rule Priority
`[enabled	disabled]`	Default: **enabled** • enabled: Enables the configuration • disabled: Disables the configuration but retains the configuration
[vendor-param *vendor-group-id*]	Specifies a vendor-specific group for an A-DSG tunnel group

Default

There are no default values for this command.

Command mode

Config mode.

Usage guidelines

A DSG tunnel group is a collection of tunnels. Linking a tunnel group to a MAC domain will create DSG rules(one for each tunnel) in the DCD on primary channels of that MAC domain. DSG traffic classified into those tunnels will also be replicated to all primary channels of the MAC domain.

Example

```
cable dsg tg 100 enabled
cable dsg tg 150 enabled
```

cable dsg timer

Use the `cable dsg timer` command to configure the DSG Initialization or Operational Timeout, or the DSG Two-way or One-way Retry Timer.

To remove this configuration, use the **no** form of this command.

`cable dsg timer` *index* [`Tdsg1` *Tdsg1*] [`Tdsg2` *Tdsg2*] [`Tdsg3` *Tdsg3*] [`Tdsg4` *Tdsg4*]
`no cable dsg timer` *index* [`Tdsg1` *Tdsg1*] [`Tdsg2` *Tdsg2*] [`dsg3` *Tdsg3*] [`Tdsg4` *Tdsg4*]

Syntax description

index	Mandatory DSG timer ID
[Tdsg1 *Tdsg1*]	Optional TLV 51.2 'DSG Initialization Timeout'
[Tdsg2 *Tdsg2*]	Optional TLV 51.3 'DSG Operational Timeout'
[Tdsg3 *Tdsg3*]	Optional TLV 51.4 'DSG Two-way Retry Timer'
[Tdsg4 *Tdsg4*]	Optional TLV 51.5 'DSG One-way Retry Timer'

Default

Default timer 1 has the following default values:

- Tdsg1=2
- Tdsg2=150
- Tdsg3=10
- Tdsg4=150

Command mode

Config mode.

Usage guidelines

Use the `cable dsg timer` command to define DSG timeout values:

51.2 DSG Initialization Timeout (Tdsg1)

51.3 2 DSG Operational Timeout (Tdsg2)

51.4 2 DSG Two-way Retry Timer (Tdsg3)

51.5 2 DSG One-way Retry Timer (Tdsg4)

Link the DSG timer to a MAC domain with the `cable mac-domain <mdid> dsg timer <timer-id>` command in order to apply the new timer values in DCD on that MAC domain.

Example

```
cable dsg timer 1
Tdsg1 2
Tdsg2 150
Tdsg3 10
Tdsg4 150
!
```

cable dsg tunnel

Use the `cable dsg tunnel` command to create Advanced-mode DOCSIS Set-top Gateway (A-DSG) tunnels on Ripple1. To remove this configuration, use the **no** form of this command. To disable A-DSG tunnels but retain their configuration, use the **disabled** form of this command.

`cable dsg tunnel` *tunnel-id*
`no cable tunnel` *tunnel-id*
`cable dsg tunnel` *tunnel-id* `disabled`

After entering the `cable dsg tunnel` command (including the *tunnel-id*), enter these additional configuration parameters using the following commands (all mandatory except enabled/disabled):

`mac_addr` *mac-addr*

`tg` *tunnel-group*

`clients` *client-list-id*

`service-class` *service-class-name*

[`enabled` | `disabled`]

Syntax description

tunnel-id	Mandatory <integer: 0...63> DSG tunnel ID
mac_addr *mac-addr*	Mandatory TLV 50.5 DSG Tunnel MAC address
tg *tunnel-group*	Mandatory DSG tunnel group

clients *client-list-id*	Mandatory DSG clients list
service-class *service-class-name*	Mandatory Default = dsg DSG service class
`[enabled | disabled]`	Default: **enabled** • enabled: Enables the configuration • disabled: Disables the configuration but retains the configuration

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

The **service class** parameter maps the tunnel to a service class name. A default service class with the name *dsg* always exists and will be used by default if the parameter is not specified.

Currently, the default service class **dsg** points to **Multicast** QOS class.

Validations:

- At least one CFR is mandatory per tunnel

Example

```
cable dsg tunnel 60
mac-address   0100.0000.0060
tg            150
service-class dsg
  enabled
clients       6
!
```

cable dsg vendor-param

Use the `cable dsg vendor-param` command to configure Advanced-mode DOCSIS Set-top Gateway (A-DSG) vendor-specific parameters on Exo. To remove this configuration, use the **no** form of this command.

`cable dsg vendor-param` *group-id* `vendor` *vendor-id* `oui` *oui* `value` *value-in-TLV*
`no cable dsg vendor-param` *group-id*

Syntax description

group-id	DSG vendor-param identifier
vendor-id	Selects the DSG vendor and associated DSG index
oui	Selects the DSG Organizationally Unique Identifier (OUI) setting
value-in-TLV	Sets the type/length value for the defined DSG vendor

Default

There are no default values for this command.

Command mode

Config mode.

Usage guidelines

This command creates a DSG vendor-specific parameter list.

- cable mac-domain <mdid> dsg channel-vendor-param <vendor-param-list-id> is mapped to TLV 51.43 in the DCD
- cable mac-domain <mdid> dsg tg <tg-id> priority <tg-priority> vendor-param <vendor-param-list-id> is mapped to TLV 50.43 in the DCD

Example

```
cable dsg vendor-param 1 vendor 1
oui   2a:fd:6a
value 00000000000000000000061646130336b37656f6e630280010
!
```

cable dsi cre-

Use the `cable dsi cre-` command series to identify the gateway to the CORE server DSI interface. This gateway is identified with these parameters:

- ip address: the CRE IPv4/IPv6 address
- vlan ID: the CRE VLAN ID

The gateway parameters configured on the CORE must match those on the CRE.

Use the **no** form of each command in the series to remove the CRE parameter.

NOTE:

These CRE parameters are configured on the CORE server.

The `cable dsi cre-` command series includes these commands:

- IPv4 address
  `cable dsi cre-ip-address` *ipv4-address/len*
  `no cable dsi cre-ip-address`
- IPv6 address
  `cable dsi cre-ipv6-address` *ipv6-address/len*
  `no cable dsi cre-ipv6-address`
- vlan ID:
  `cable dsi cre-vlan-id` *vlan-id*
  `no cable dsi cre-vlan-id`

Syntax description

ip-address *ipv4-address/len*	<ipv4 address> Default 172.16.255.1/25 Mandatory The CRE server IPv4 address and subnet mask • This IPv4 address must match the actual CRE server IPv4 address Changing this value is service affecting. The *admin-state* of all every enabled cable mac-domain must first be set to *down*.
ipv6-address *ipv6-address/len*	<ipv6 address> Mandatory The CRE server IPv6 address and subnet mask • This IPv6 address must match the actual CRE server IPv6 address Changing this value is service affecting. The *admin-state* of every enabled cable mac-domain must first be set to *down*.
vlan-d *vlan-id*	<vlan-id> Mandatory The CRE server vlan-id • This vlan-id must match the actual CRE server vlan-id

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

See the descriptions in the *Syntax description* for usage guidelines.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

cable dsi gcp-ip-address

Use the `cable dsi gcp-ip-address` command to define the principal CCAP Core network element that communicates with R-PHY (Remote PHY) devices using GCP (General Control Protocol):

`cable dsi gcp ip-address` *ipv4-addr*

Syntax description

ipv4-addr	IPv4 address within an IP subnet configured in the CRE on the DSI VLAN

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

The CableOS Core has a single **cable dsi gcp** configuration.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

IMPORTANT: For any changes to this configuration to take effect, you MUST reboot the RPD.

cable dsi lcce-assignment explicit

Use the `cable dsi lcce-assignment explicit` command to explicitly assign specific MAC domains to specific LCCEs.

`cable dsi lcce-assignment explicit rule` *rule-id* `md-set` *mds* `lcce-set` *lcces*

Syntax description

rule-id	Numeric ID which determines the order of rule application. Nonsequential IDs are allowed.
mds	A comma-separated list of `cable mac-domain` names.
lcces	Set of LCCE IDs, which starts from 1 and ends with the `cable dsi lcce-ip-address-pool count`. **NOTE:** The size of this set is currently limited to 1.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

Use the `cable dsi lcce-assignment explicit` rules to assign MAC domains to specific LCCEs. Such assignment can be useful when the MAC domains have different types, properties, cable modem count, bandwidth, etc. MAC domains which have not been assigned explicitly will be assigned implicitly, that is they will be arranged uniformly across the rest of LCCEs.

Limitations

- Currently, all LCCEs can contain no more than 4 MAC domains.
- The MAC domains must be disabled (`admin-state down`) to change their LCCE. Any configuration commit for an LCCE change of an enabled (`admin-state up`) MAC domain will be rejected and a list of affected MAC domains together with suggested configuration fixes will be printed.
  - Simply increasing the `cable dsi lcce-ip-address-pool count` will not immediately lead to reassignmentof non-explicit MAC domains. The newly created LCCEs will be available for new or re-enabled MAC domains.
  - Also, removing an existing rule does not require disabling affected MAC domains. They will retain their old LCCEs as long as they are enabled or until a conflicting rule is added.

Examples

This is an example of moving enabled MAC domains from multiple LCCEs into a single LCCE:

```
admin@CableOS> show lcce 1

LCCE ID  MAC DOMAIN    LCCE IPV4 ADDRESS  LCCE IPV6 ADDRESS
-------  ------------  -----------------  ---------------------------------------
      1  Md1:0/0.0     200.200.132.101    -
      1  Md29:0/0.0    200.200.132.101    -
      1  Md57:0/0.0    200.200.132.101    -
      1  Md85:0/0.0    200.200.132.101    -
```

```
=================================================================================
Command total:   1 LCCE    4 MD
admin@CableOS> config
admin@CableOS(config)# cable dsi lcce-assignment explicit rule 1 md-set
 1:0/0.0,2:0/0.0,3:0/0.0,4:0/0.0 lcce-set 1
admin@CableOS(config)# commit
Aborted: MAC domains must be disabled before switching to another LCCE:
* 2:0/0.0 is about to change its LCCE from 2 to 1.
* 3:0/0.0 is about to change its LCCE from 3 to 1.
* 4:0/0.0 is about to change its LCCE from 4 to 1.
* 29:0/0.0 is about to change its LCCE from 1 to 2.
* 57:0/0.0 is about to change its LCCE from 1 to 3.
* 85:0/0.0 is about to change its LCCE from 1 to 4.
Apply the following configuration to proceed:

cable mac-domain 2:0/0.0 admin-state down
cable mac-domain 3:0/0.0 admin-state down
cable mac-domain 4:0/0.0 admin-state down
cable mac-domain 29:0/0.0 admin-state down
cable mac-domain 57:0/0.0 admin-state down
cable mac-domain 85:0/0.0 admin-state down

Alternatively, adjust the cable dsi lcce-assignment.

admin@CableOS(config)# cable mac-domain 2:0/0.0 admin-state down
admin@CableOS(config-mac-domain-2:0/0.0)# cable mac-domain 3:0/0.0 admin-state down
admin@CableOS(config-mac-domain-3:0/0.0)# cable mac-domain 4:0/0.0 admin-state down
admin@CableOS(config-mac-domain-4:0/0.0)# cable mac-domain 29:0/0.0 admin-state down
admin@CableOS(config-mac-domain-29:0/0.0)# cable mac-domain 57:0/0.0 admin-state
 down
admin@CableOS(config-mac-domain-57:0/0.0)# cable mac-domain 85:0/0.0 admin-state
 down
admin@CableOS(config-mac-domain-85:0/0.0)#
admin@CableOS(config)# commit
Commit complete.
admin@CableOS(config)# do show lcce 1

LCCE ID  MAC DOMAIN    LCCE IPV4 ADDRESS  LCCE IPV6 ADDRESS
-------  ------------  -----------------  ---------------------------------------
      1  Md1:0/0.0     200.200.132.101    -

=================================================================================
Command total:   1 LCCE    1 MD
admin@CableOS(config)# cable mac-domain 2:0/0.0 admin-state up
admin@CableOS(config-mac-domain-2:0/0.0)# cable mac-domain 3:0/0.0 admin-state up
admin@CableOS(config-mac-domain-3:0/0.0)# cable mac-domain 4:0/0.0 admin-state up
admin@CableOS(config-mac-domain-4:0/0.0)#
admin@CableOS(config)# commit
Commit complete.
admin@CableOS(config)# do show lcce 1

LCCE ID  MAC DOMAIN    LCCE IPV4 ADDRESS  LCCE IPV6 ADDRESS
-------  ------------  -----------------  ---------------------------------------
      1  Md1:0/0.0     200.200.132.101    -
      1  Md2:0/0.0     200.200.132.101    -
      1  Md3:0/0.0     200.200.132.101    -
      1  Md4:0/0.0     200.200.132.101    -

=================================================================================
Command total:   1 LCCE    4 MD
```

Related information

cable dsi lcce-ip-address-pool

cable dsi lcce-ip-address-pool

Use the `cable dsi lcce-ip-address-pool` command to configure a pool of IPv4/IPv6 addresses on the DSI VLAN subnet that the CableOS Core may use for an L2TPv3 Control Connection Entity (LCCE):

`cable dsi lcce-ip-address-pool` [`start-ipv4-addr` *start-ipv4-addr*] [`start-ipv6-addr` *start-ipv6-addr*] [`count` *count*]

Syntax description

start-ipv4-addr	Starting address within an IPv4 subnet configured on the CRE for the DSI subnet. If the field is null (0.0.0.0) or not configured, IPv4 addresses will not be assigned to the LCCEs. Changing this value is service affecting. The *admin-state* of all every enabled cable mac-domain must first be set to *down*.
start-ipv6-addr	Starting address within an IPv6 subnet configured on the CRE for the DSI subnet. If the field is null (::) or not configured, IPv6 addresses will not be assigned to the LCCEs. Changing this value is service affecting. The *admin-state* of every enabled cable mac-domain must first be set to *down*.
count	Number of IPv4/IPv6 addresses, starting with the *start-ipv4-addr* / *start-ipv6-addr*, that the CableOS Core uses as LCCEs Harmonic recommends configuring at least 24 LCCE IP addresses.

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Examples

The example below will produce two LCCEs; the first with IPs 200.200.59.101/2001:db8:a::1, and the second with IPs 200.200.59.102/2001:db8:a::2

```
cable dsi lcce-ip-address-pool start-ipv4-addr 200.200.59.101
cable dsi lcce-ip-address-pool start-ipv6-addr 2001:db8:a::1
cable dsi lcce-ip-address-pool count 2
```

Related information

cable dsi lcce-assignment explicit

cable dynamic-secret exclude

Use the `cable dynamic-secret exclude` command to exclude a single cable modem or all cable modems of a specified vendor from being processed by the Dynamic Shared Secret feature:

`cable dynamic-secret exclude` { `oui` *oui-id* | `modem` *mac-address* }

Syntax description

`oui` *oui-id*	Specifies the organization unique identifier (OUI) of a vendor, so that cable modems from this vendor are excluded from the Dynamic Shared Secret feature. The OUI is specified as three hexadecimal bytes separated by either periods or colons
`modem` *mac-address*	Specifies the MAC address of a single cable modem to be excluded from the Dynamic Shared Secret feature; you cannot specify a multicast MAC address

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

There are no Usage Guidelines for this command.

Examples

The following example excludes all modems of the vendor with OUI **00.01.B4** (hexadecimal):

```
cable dynamic-secret exclude oui 00.01.B4
```

The following example excludes the single modem with MAC address 00d0.45ba.b34b (hexadecimal):

```
cable dynamic-secret exclude modem 00d0.45ba.b34b
```

cable dynamic-secret tftp insert upgrade server

Use the `cable dynamic-secret tftp insert upgrade server` command to dynamically insert the IPv4 or IPv6 TLV values in the DOCSIS configuration file to complete firmware upgrade on cable modems.

`cable dynamic-secret tftp insert upgrade server`

Syntax description

This command has no arguments or keywords.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

The Dynamic Shared Secret feature must be enabled before you can upgrade the firmware on cable modems. The command to enable or disable the Dynamic Shared Secret feature is available at the MAC domain level. However, the command to upgrade the firmware on cable modems is available at the global level.

cable event control

The `cable event control` command enables the sending of events to SNMP traps based on the DOCSIS event ID. reference description.

`cable event control` [*event-id*]

To disable the use of events, use the **no** form of the command:

`no cable event control` [*event-id*]

Syntax description

event-id	The DOCSIS event code

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

SNMP traps will work if the corresponding subgroups of the traps are configured in the `snmp-server enable traps docsis-events` settings.

Examples

The following example allows events to be sent for DOCSIS events `67020100` and `67020400`.

```
admin@CableOS(config)# cable event control 67020100
admin@CableOS(config)# cable event control 67020400
```

Related information

cable event priority

snmp-server enable traps docsis-events

Logging

cable event priority

Use the `cable event priority command` to configure the event reporting flags for DOCSIS event messages that determine how the CMTS reports these events.

`cable event priority` { `alert` | `critical` | `debug` | `emergency` | `error` | `informational` | `notice` | `warning` | } *destination*

To return to the default settings found in the MIB, use the **no** form of this command:

`no cable event priority`

Syntax description

`alert`	Sets the event reporting flag for alert system error messages. (Alert messages indicate that some type of system or connection failure has occurred that requires immediate attention.)
`critical`	Sets the event reporting flag for critical system error messages. (Critical messages indicate that an error occurred that requires immediate attention to avoid system or connection failure.)

`debug`	Sets the event reporting flag for debug system error messages. (Debug messages appear only when debugging has been enabled.)
`emergency`	Sets the event reporting flag for emergency system error messages. (Emergency messages indicate that the system has become unusable and requires immediate attention. This problem might also be affecting other parts of the network.)
`error`	Sets the event reporting flag for error system error messages. (Error messages indicate that an error condition occurred that requires attention to resolve. Failure to address the problem will result in some type of system or connection failure in the near future.)
`informational`	Sets the event reporting flag for informational system error messages. (Informational messages might or might not be significant to system administrators.)
`notice`	Sets the event reporting flag for notice system error messages. (Notice messages indicate that a situation occurred that is normal but is significant enough that system administrators might want to be advised.)
`warning`	Sets the event reporting flag for warning system error messages. (Warning messages indicate that a condition occurred that indicates attention is needed in the near future to avoid potential problems. Failure to address this problem could result in some type of system or connection failure later.)
destination	Defines where each priority will be written. The possible values are: • local - the event is written to the local log file • syslog - the event is written to syslog • traps - the event is written to SNMP traps. You can define an event type to be written to more than one location. Separate the different locations using commas.

Default

There is no default for this command.

Command mode

Config mode.

Examples

The following example defines that all notice events will be written to the local log:

```
cable event priority notice local
```

The following example defines that all alert events will be written to syslog:

```
cable event priority alert syslog
```

The following example defines that all critical events will be written to the local log, to syslog, and to the SNMP traps:

```
cable event priority critical local, syslog, traps
```

Related information

Logging
cable event control
snmp-server enable traps docsis-events

cable fiber-node

Use cable fiber-node to add or change the configuration for one fiber-node:

`cable fiber-node` *fn-name* [`ds-rf-port` *vc:vs/p*] [`us-rf-port` *vc:vs/p*]

To remove the configuration for one fiber-node, use the **no** version of this command:

`no cable fiber-node` *fn-name* [`ds-rf-port` *vc:vs/p*] [`us-rf-port` *vc:vs/p*]

Syntax description

[`ds-rf-port` *vc:vs/p*]	References the ds-rf-port configured as **cable ds-rf-port** *vc:vs/p*
[`us-rf-port` *vc:vs/p*]	References the us-rf-port configured as **cable us-rf-port** *vc:vs/p*

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

The **cable fiber-node** configuration informs the COS CORE of the topology of the RF connections of fiber nodes to RPD ds-rf-ports and us-rf-ports.

A unique combination of ds-rf-port and us-rf-port is called a CM Service Group (CM-SG). Although multiple fiber nodes may be combined to the same us-rf-port upstream and split from the same ds-rf-port downstream, all of the fiber nodes are by definition in the same CM Service group, and must use the same **fn-name** to identify the CM-SG in a **cable fiber-node** *fn-name* configuration.

The COS CORE enforces the following constraints for a valid RF topology and **cable fiber-node** configuration:

- Downstream RF signals from one ds-rf-port may be split to at most four (4) different CM-SGs, which means that the ds-rf-port may be associated with up to four different us-rf-ports. In other words, a particular **ds-rf-port** *vc:vs/p* may referenced by up to four different **cable fiber-node** *fn-name* configurations
- Downstream RF signals from more than one ds-rf-port may not be combined to reach the same fiber-node. A particular upstream port **us-port** *vc:vs/p* may be in only a single CM-SG and associated with a single ds-rf-port in a single **cable fiber-node** *fn-name* configuration
- Similarly, upstream RF signals from a physical fiber-node may not be split to more than one us-rf-port. A particular upstream port **us-port** *vc:vs/p* may appear in only a single cable **fiber-node** configuration
- When downstream RF signals from one ds-rf-port are split to multiple fiber-nodes, the upstream RF signals from those fiber nodes must all reach us-rf-ports on the same RPD, such as an 80G12 line card. This is because the COS CORE implements mac-domains on a single RPD.

NOTE:

CableOS operation on any change to **cable fiber-node** configuration that affects an administratively **up** mac domain is not defined; CMs may de-register or fail to transmit downstream or upstream. While a mac-domain on a particular ds-rf-port is administratively **up**, any cable fiber-node associating that ds-rf-port must not be deleted and no new **cable fiber-node** configurations that include that (**up**) ds-rf-port may be added.

cable filter group

Use the `cable filter group` command to create a single cable filter group rule option.

`cable filter group` *group-id* `index` *index-num option option-value*

Syntax description

group-id	Mandatory. Specifies a unique group ID for this filter group. The valid values are integers in the range 1 - 254.
index-num	Mandatory. Specifies a unique index for this particular filter. The valid values are integers in the range 1 - 255.

Rule options

`src-ip` *ip-address*	(Optional) Specifies the source IP address that should be matched. The default IP address is 0.0.0.0 (IPv4 filters only).

`src-mask` *mask*	(Optional) Specifies the mask for the source address that should be matched. The *mask* is ANDed with the IP address specified by the src-ip option and compared to the result of ANDing the *mask* with the packet's source IP address. The filter only considers it a match if the two values are the same (IPv4 filters only). Note: The default mask of 0.0.0.0 matches all IP addresses.
`src-port port-number`	(Optional) Specifies the TCP/UDP source port number that should be matched. The range is from 0 to 65535. The default value matches all TCP/UDP port numbers (IPv4 and IPv6 filters).
`dest-ip ip-address`	(Optional) Specifies the destination IP address that should be matched. The default IP address is 0.0.0.0 (IPv4 filters only).
`dest-mask mask`	(Optional) Specifies the mask for the destination address that should be matched. The mask is ANDed with the IP address specified by the dest-ip option and compared to the result of ANDing the mask with the packet's destination IP address. The filter only considers it a match if the two values are the same (IPv4 filters only). Note: The default mask of 0.0.0.0 matches all IPv4 addresses.
`dest-port port-number`	(Optional) Specifies the TCP/UDP destination port number that should be matched. The range is from 0 to 65535. The default value matches all TCP/UDP port numbers (IPv4 and IPv6 filters).
`ip-proto proto-type`	(Optional) Specifies the IP protocol type number that should be matched. The range is from 0 to 256. The default is 256, which matches all protocols (IPv4 and IPv6 filters). Some commonly-used values are: • 1 — ICMP, Internet Control Message Protocol. • 2 — IGMP, Internet Group Management Protocol. • 4 — IP in IP encapsulation. • 6 — TCP, Transmission Control Protocol. • 17 — UDP, User Datagram Protocol.

`ip-tos tos-mask tos-value`	(Optional) Specifies a type of service (ToS) mask and value to be matched (IPv4 and IPv6 filters): • *tos-mask* — 8-bit value expressed in hexadecimal notation. The valid range is 0x00 through 0xFF. • *tos-value* — 8-bit value expressed in hexadecimal notation. The valid range is 0x00 through 0xFF. The *tos-mask* is logically ANDed with the *tos-value* and compared to the result of ANDing the *tos-mask* with the packet's actual ToS value. The filter only considers it a match if the two values are the same. The default values for both parameters match all ToS values.
`range-dest-port start-port-number end-port number`	(Optional) Specifies the TCP/UDP destination port start range. The range is from 0 to 65535.
`range-ip-tos mask start-value end-value`	(Optional) Specifies the IP ToS byte range settings expressed in hexadecimal notation. The range is from 0x00 through 0xFF.
`range-src-port start-port number end-port number`	(Optional) Specifies the TCP/UDP source port start range. The range is from 0 to 65535.
`v6-src-address ipv6-address`	(Optional) Specifies the IPv6 source address that should be matched using the format X:X:X:X::X (IPv6 filters only).
`v6-src-pfxlen prefix-length`	(Optional) Specifies the length of the network portion of the IPv6 source address. The range is from 0 to 128 (IPv6 filters only). The default is 0 (matching all IPv6 addresses).
`v6-dest-address ipv6-address`	(Optional) Specifies the length of the network portion of the IPv6 source address. The range is from 0 to 128 (IPv6 filters only). The default is 0 (matching all IPv6 addresses)
`v6-dest-pfxlen prefix-length`	(Optional) Specifies the length of the network portion of the IPv6 destination address. The range is from 0 to 128 (IPv6 filters only). The default is 0 (matching all IPv6 addresses).
`ip-version`	(Optional) Specifies the IP version of the filter: • ipv4 — Filter is an IPv4 filter group (default). • ipv6 — Filter is an IPv6 filter group.

`match-action {accept | drop}`	(Optional) Specifies the action that should be taken for packets that match this filter (IPv4 and IPv6 filters): • accept — Packets that match the filter are accepted (default). • drop — Packets that match the filter are dropped.

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

This command configures cable filter groups as defined for DOCSIS Subscriber Management packet filtering. In this release, the CableOS Core does not support the creation or deletion of cable filter groups with SNMP.

To enter a mode to configure a cable filter group, enter the following in config mode:

```
cable filter group group-id
```

In cable filter group configuration mode, enter the following to enter a mode to configure a cable filter group rule:

```
    (filter-group group-id )#  index index-num
```

In cable filter group rule configuration mode, enter individual options of the rule with the following:

```
     (filter-group group-id  index index-num )# option  option-value
```

To delete a single option of a cable filter group, commit the following from config mode with

```
     # no cable filter group group-id i ndex index-num option [ option-value ]
```

or from cable filter group configuration mode with

```
     (filter-group group-id)# no index index-num option [ option-value ]
```

or from cable filter group rule configuration mode with

```
     (filter-group group-id index index-num ) no option [ option-value ]
```

Note that option-value is optional when deleting an option.

To delete an entire rule of a cable filter group, commit the following from config mode with

```
     # no cable filter group group-id index index-num
```

or from cable filter group configuration mode with

```
     (filter-group group-id )#  no index index-num
```

To delete an entire cable filter group, commit the following from config mode:

```
    # no cable filter group group-id
```

NOTE:

A rule index applies to only IPv4 or only IPv6 packets, never both. If the rule includes one of the v6-src-address *, v6-dest-address * or ip-version ipv6 criteria, it applies to IPv6 packets only; otherwise it applies to IPv4 packets only. Note that if a rule does not contain the ip-version criterion or any criterion for an IP address (for example, it contains only port range criteria), the rule applies to IPv4 packets only.

NOTE:

Before configuring layer 4 src-port and dest-port options, configure the IP protocol number using the ip-proto option. If a layer 4 IP protocol is not configured, the default value (256) is used and the filter groups configured with multiple filters will fail.

NOTE:

When matching the source or destination addresses, the filter ANDs the mask value with the filter's corresponding IP address. The filter then ANDs the mask with the packet ' s actual IP address and compares the two values. If they are the same, the filter matches the packet. For example, if you specify a src-ip of 192.168.100.0 and a src-mask of 255.255.255.0, the filter matches all packets that have a source IP address in the range of 192.168.100.0 through 192.168.100.255. Use a mask value of 0.0.0.0 (default) to match all IPv4 addresses. Use a mask value of 255.255.255.255 to match one specific IPv4 address. Similarly, when comparing ToS values, the filter ANDs the *tos-mask parameter* with the *tos-value* parameter and compares it to the result of ANDing the *tos-mask* parameter with the packet's actual ToS value. If the two values are the same, the filter matches the packet.

Consider the following restrictions and guidelines when configuring IPv6 cable filter groups:

- Chained IPv6 headers are not supported.
- If you need to support IPv4 and IPv6 filters for the same filter group, then you must use separate index numbered rules within the same filter group ID, and configure one rule index as ip-version IPv4, and the other index as ip-version IPv6.

Examples

The following example shows configuration of an IPv4 filter group that drops packets with a source IP address of 10.7.7.7 and a destination IP address of 10.8.8.8, and a source port number of 2000 and a destination port number of 3000. All protocol types and ToS values are matched:

```
cable filter group 10 index 10 src-ip 10.7.7.7
cable filter group 10 index 10 src-mask 255.255.0.0
cable filter group 10 index 10 dest-ip 10.8.8.8
cable filter group 10 index 10 dest-mask 255.255.0.0
cable filter group 10 index 10 ip-proto 256
cable filter group 10 index 10 src-port 2000
cable filter group 10 index 10 dest-port 3000
cable filter group 10 index 10 match-action drop
```

The following example shows the configuration of an IPv6 filter group that drops traffic from a specific IPv6 host (with source address 2001:33::20B:BFFF:FEA9:741F/128) behind a CMTS to an IPv6 host on the network (with destination address 2001:1::224/128):

Specify the filter group criteria using ID 254

```
!cable filter group 254 index 128 v6-src-address 2001:33::20B:BFFF:FEA9:741F
cable filter group 254 index 128 v6-src-pfxlen 128
cable filter group 254 index 128 v6-dest-address 2001:1::224
cable filter group 254 index 128 v6-dest-pfxlen 128
```

Specify that the filter group is IPv6

```
cable filter group 254 index 128 ip-version IPv6
```

Specify the drop action for matching packets

```
cable filter group 254 index 128 match-action drop
```

Apply the filter group with ID 254 to all CM upstream traffic

```
cable submgmt default filter-group cm upstream 254
```

Related information

cable submgmt default active
cable submgmt default filter-group
cable submgmt default cpe-max-ipv4 cpe-max-ipv6
show cable filter

cable flap-list aging

Use the `cable flap-list aging` command to specify the time (in minutes) to keep a CM in the flap-list table before aging it out of the table. To restore the factory default setting, use the **no** form of this command.

`cable flap-list aging` *minutes*
`no cable flap-list`

Syntax description

minutes	Specifies how long, in minutes, that a CM remains in the flap list. The range is from 1 to 86400. The default is 10080 (seven days).

Default

A CM is kept in the flap-list table for 10080 minutes (1 week).

Command mode

Config mode.

Usage guidelines

Flapping refers to the rapid disconnecting and reconnecting of a CM that is having problems holding its connection to the CMTS. A flap-list is a table maintained by the Harmonic CMTS for every modem (active or not) that is having communication difficulties. The flap-list contains modem MAC addresses and logs the time of the most recent activity. You can configure the size and entry thresholds for the flap list.

Examples

The following example shows how to specify that the flap-list table retain 2400 minutes (40 hours) of performance for this CM:

```
cable flap-list aging 2400
```

Related information

cable flap-list power-adjust threshold
cable flap-list size
clear cable flap-list
show cable filter

cable flap-list insertion-time

Use the `cable flap-list insertion-time` command to set the cable flap-list insertion time interval. To restore the factory default setting, use the **no** form of this command.

```
cable flap-list insertion-time seconds
no cable flap-list insertion-time
```

Syntax description

seconds	Specifies, in seconds, the insertion time interval. The range is from 60 to 86400. The default is 180 (three minutes).

Default

The default insertion time is 180 seconds (three minutes).

Command mode

Config mode.

Usage guidelines

This command controls the operation of a flapping modem detector. When a CM makes two or more initial Ranging Requests (also known as insertion or reinsertion requests) within the period of time defined by this command, the CM is placed in the flap list. A CM is not put into the flap list if the time between its two consecutive initial Ranging Requests is greater than the insertion time interval.

For example, if the CMTS is configured for the default insertion time of three minutes, and if the CM reinserts itself four minutes after its last insertion, the CM is not placed in the flap list. However, if the CM re-inserts itself two minutes after its last insertion, the CM is placed in the flap list.

Also, a CM is put into the flap list only once for each insertion time interval, even if the CM reinserts itself multiple times. For example, if the CMTS is set for the default insertion time interval of 3 minutes, and the CM reinserts itself three times within that period, the flap list shows that the CM has flapped once. If the CM reinserts itself three times within the first 3 minute period and three more times within the next 3 minute period, the flap list shows that the CM has flapped twice.

Examples

The following example shows how to set the insertion time interval to ninety seconds:

```
cable flap-list insertion-time 90
```

Related information

cable flap-list aging

cable flap-list power-adjust threshold

cable flap-list size

clear cable flap-list

show cable filter

cable flap-list miss-threshold

Use the `cable flap-list miss-threshold` command to specify the number of times that consecutive MAC-layer keep alive messages can fail before a CM is placed on the flap-list. To restore the factory default setting, use the **no** form of this command.

```
cable flap-list miss-threshold misses
no cable flap-list miss-threshold
```

Syntax description

misses	Specifies the number of consecutive MAC-layer keep-alive (Station Maintenance) messages that can be missed before a CM is placed in the flap list. The range is from 1 to 12. The default is 6.

Default

The default number of station maintenance messages that can be missed is 6.

Command mode

Config mode.

Usage guidelines

In a DOCSIS network, the CMTS regularly sends out MAC-layer keep-alive messages, known as station maintenance messages, to each CM that is online. If a CM does not respond to a station maintenance message, the CMTS repeats sending these messages either until the CM responds or the CMTS reaches the maximum allowable number of messages that can be sent.

The cable flap-list miss-threshold command specifies how many consecutive station maintenance messages can be missed before the cable modem is placed in the flap list. A miss occurs when a CM does not reply to a station maintenance message.

Examples

The following example shows how to set the miss threshold to eight:

```
cable flap-list miss-threshold 8
```

Related information

cable flap-list aging
cable flap-list insertion-time
cable flap-list size
clear cable flap-list
show cable filter

cable flap-list power-adjust threshold

Use the `cable flap-list power-adjust threshold` command to specify the power-adjust threshold for recording a flap-list event. To restore the factory default setting, use the **no** form of this command.

```
cable flap-list power-adjust threshold dB
no cable flap-list power-adjust threshold
```

Syntax description

dB	Specifies the minimum power adjustment, in decibels, that results in a flap-list event. The range is from 1 to 10. The default is 2.

Default

The default minimum power adjustment threshold is 2 dB.

Command mode

Config mode.

Usage guidelines

This command controls the operation of a flapping modem detector. When the power adjustment of a CM exceeds the configured threshold value, the modem is placed in the flap list.

Examples

The following example shows how to set the power-adjust threshold to five decibels:

```
cable flap-list power-adjust threshold 5
```

Related information

cable flap-list aging
cable flap-list insertion-time
cable flap-list power-adjust threshold
cable flap-list size
clear cable flap-list
show cable filter

cable flap-list size

Use the `cable flap-list size` command to specify the maximum number of CMs that can be displayed from the flap-list. To reset to the default size, use the **no** form of the command.

`cable flap-list size` *number*
`no cable flap-list size`

Syntax description

number	Maximum number of CMs to be displayed. The range is from 1 to 8191 depending on the type of line cards. The default is 100.

Default

The default number of CMs is 100.

Command mode

Config mode.

Usage guidelines

The flap-list size is determined by the CMTS architecture and the cable line cards. Previously, cable flap-list tables were stored on the Route Processors and Performance Routing Engine (PRE) modules.

Examples

The following example shows how to set the maximum number of CMs for every downstream to 250:

```
cable flap-list size 250
```

Related information

cable flap-list aging
cable flap-list insertion-time
cable flap-list power-adjust threshold
clear cable flap-list
show cable filter

cable freq-range european

Use the `cable freq-range european` command to support Annex A upstream frequencies with Annex B downstream.

`cable freq-range european` [`enabled` | `disabled`]

Syntax description

`enabled|disabled`	The default value is disabled.

Default

See the syntax description.

Command mode

Config mode

Usage guidelines

The impact of this command on the system is as follows:

- When disabled is selected, the system is unaffected and there is no change in system behavior
- When enabled is selected, then the following occurs:
  - If the system is Annex A, the system is unaffected and there is no change in system behavior
  - If the system is Annex B:
    - For DOCSIS 3.0 CMs only, the upstream channels maximal standard frequency will be 65 MHz (Annex A maximum frequency) instead of 42 MHz (Annex B maximum frequency)
    - For DOCSIS 2.0 and 3.1 CMs, there is no change in system behavior

Examples

The example shows how to enable the use of Annex A frequencies:

```
cable freq-range european enabled
```

cable gcp core-type

Use the `cable gcp core-type` command to specify whether the GCP Core is the principal or auxiliary Core.

`cable gcp core-type` { *primary auxiliary* }

Syntax description

`primary`	This Core is the primary Core.
`auxiliary`	This Core is an auxiliary Core.

Default

The default value for the command is primary.

Command mode

Config mode.

Usage guidelines

The definition of the GCP Core as primary or auxiliary is used to manage actions of GCP configuration for R-PHY.

IMPORTANT: For any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines the GCP Core as an auxiliary Core:

```
cable gcp core-type auxiliary
```

cable l2vpn dot1q

Use the `cable l2vpn dot1q` command to map a CM MAC address to l2vpn.

`cable l2vpn dot1q` *vlan-id* `cm-mac-address` *mac-address* `l2vpn-id` *map-id*

To remove the mapping from a specific vlan id, use the following:

`no cable l2vpn dot1q` *vlan-id*

Syntax description

vlan-id	The ID of the VLAN. Valid values are in the range of 2 - 4094. 🚫 **Restriction:** The vlan-id must be unique. It cannot be the same as any of the following: • cable bundle cre-vlan-id • cable sub-bundle cre-vlan-id (for each sub-bundle) • cable dsi cre-vlan-id • cable provisioning cre-vlan-id • cable mcast cre-vlan-id • system management sub-interface cre-vlan-id If by mistake you set the vlan-id to one which already exists, you will receive an error message similar to this one: `This vlan-id (2401) is being used by ‘cable bundle cre-vlan-id’ configuration’`
mac-address	The CM MAC address for which a l2vpn mapping is being created.
map-id	A string to serve as a l2vpn ID for mapping.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

After applying the mapping, you must reset the CM.

If there is more than one VLAN mapped to a certain CM the one with the **LOWER** VLAN-ID value will take effect.

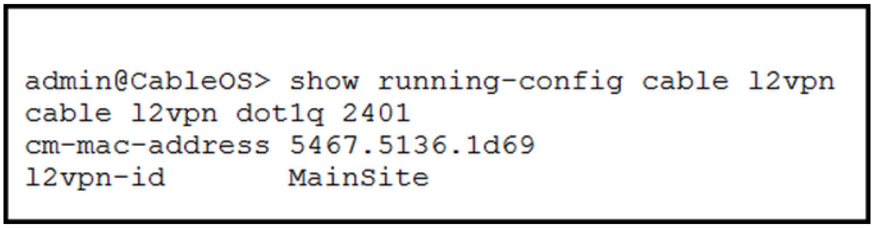
This l2vpn configuration **OVERRIDES** any l2vpn configuration from the CM config file.

Examples

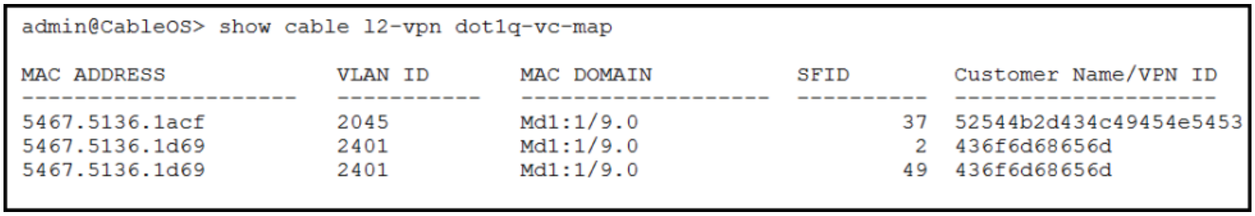
The example below shows how to map vlan 2401 to mac address 5467.5136.1d69 and give it a mapping ID of MainSite

```
admin@CableOS(config)# cable l2vpn dot1q 2401 cm-mac-address 5467.5136.1d69 l2vpn-id
 MainSite
```

You can check your mappings using the `show running -config` and `show cable l2-vpn dot1q-vc-map` commands. Below are examples of the output of these commands:



```
admin@CableOS> show running-config cable l2vpn
cable l2vpn dot1q 2401
cm-mac-address 5467.5136.1d69
l2vpn-id       MainSite
```



```
admin@CableOS> show cable l2-vpn dot1q-vc-map

MAC ADDRESS              VLAN ID      MAC DOMAIN           SFID        Customer Name/VPN ID
---------------------    -----------  -------------------- ----------  --------------------
5467.5136.1acf           2045         Md1:1/9.0                    37  52544b2d434c49454e5453
5467.5136.1d69           2401         Md1:1/9.0                     2  436f6d68656d
5467.5136.1d69           2401         Md1:1/9.0                    49  436f6d68656d
```

cable l2vpn mpls-to-vlan-mapping

Use the `cable l2vpn mpls-to-vlan-mapping` command to convert L2VPN MPLS encapsulation to L2VPN 802.1q encapsulation using VCID hashing to calculate the VLAN.

`cable l2vpn mpls-to-vlan-mapping` { `enabled` | `disabled` } [`min-vlan-id` *min-vlan-id*] [`max-vlan-id` *max-vlan-id*]

Syntax description

`enabled|disabled`	Enable or disable the functionality. The default is disabled.
min-vlan-id	The number for the minimum VLAN ID (VID_{min}). The default value is 2.
max-vlan-id	The number for the maximum VLAN ID (VID_{max}). The default value is 4094.

Default

By default, this functionality is disabled.

Command mode

Config mode

Usage guidelines

The formula used for the VID calculation is:

$$\text{VID} = F(\text{VCID}, \text{VID}_{\text{min}}, \text{VID}_{\text{max}}) = \text{VID}_{\text{min}} + (\text{hash}(\text{VCID}) \% (\text{VID}_{\text{max}} + 1 - \text{VID}_{\text{min}}))$$

where

hash(x) – hash function which returns (0..18446744073709551615)

% - modulo operation
VCID – Variable length source attachment individual id (any byte sequence, no restrictions)
$\mathbf{VID_{min}}$ – minimum VLAN ID
$\mathbf{VID_{max}}$ – maximum VLAN ID

Examples

The following example enables the functionality with a minimum VLAN ID of 10 and a mximum VLAN ID of 4000

```
cable l2vpn mpls-to-vlan-mapping enabled min-vlan-id 10 max-vlan-id 4000
```

Related information

show cable l2-vpn mpls

cable lawful-intercept

Use the `cable lawful-intercept` command to configure the source IPv4 address of the packets to be intercepted.

```
cable lawful-intercept core-ip IPv4 address
no cable lawful-intercept
```

Syntax description

IPv4 address	The source IP address of the packets. If this address is not provided, the nsi,prov IP address is used.

Default

See the Syntax description.

Command mode

Config mode.

Usage guidelines

Use this command to override the source IP address of intercepted packets. By default nsi.prov IP address is used.

Examples

The following example sets the source IP address to 176.25.6.234

```
cable lawful-intercept core-ip 176.25.6.234
```

cable load-balance

Use the `cable load-balance` command to enable/disable load balancing on the CMTS.

`cable load balance` { *enabled* | *disabled* }

Syntax description

Enabled	Load balancing is enabled.
Disabled	Load balancing is disabled.

Default

By default, load balancing is disabled.

Command mode

Config mode.

Usage guidelines

Even with the cable load-balance option set to enabled, Dynamic Load Balancing (DLB) will not be operational until at least one load-balance direction is configured (see *cable load-balance downstream*, *cable load-balance upstream*).

This feature provides downstream and upstream Dynamic Load Balancing based on a utilization method that uses the interface's (DS SC-QAM, US SC-AM, OFDM and OFDMA) current percentage of utilization to determine the current load. This method uses the amount of traffic being sent over an interface, in the form of the percentage of total bandwidth being used. Dynamic load balancing takes into account the bandwidth (as determined by the modulation profiles and channel widths) of each interface when evaluating the load on those interfaces. For example, if two upstreams are being load-balanced, and the first upstream has twice the bandwidth of the second upstream, the two upstreams are considered balanced when they reach the same percentage of utilization. The first upstream is carrying more traffic than the second upstream because it has a larger capacity for traffic, but the percentage of utilization will be the same.

Do not use dynamic load balancing on cable interfaces that have a small number of cable modems and where a single modem is responsible for the majority of the interface load. In this condition, the CMTS could end up continually moving cable modems from one interface to another in an endless attempt to load balance the interfaces. To avoid this, configure the utilization threshold to a value that is higher than that which can be caused by any single cable modem. (refer to the cable load-balance downstream threshold and cable load-balance upstream threshold).

Example

The following example enables DLB:

```
cable load-balance enabled
```

Related information

cable load-balance balancing-period secs

cable load-balance exclude

cable load-balance fail-exclude-period-secs
cable load-balance move-exclude-period-secs
cable load-balance restrict modem
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
clear cable load-balance
show cable load-balance
show cable load-balance exclude-list
cable load-balance block-period
show cable load-balance distribution

cable load-balance balancing-period secs

Use the `cable load-balance balancing period secs` command to define how often (in seconds) the CMTS should perform load balancing.

`cable load-balance balancing-period secs` *period*

Syntax description

`interval`	Specifies the balancing period in the range of 60 .. 40000 seconds.

Default

The default value is 600 seconds (10 minutes).

Command mode

Config mode.

Usage guidelines

This option is common for both the upstream and downstream directions. First downstream dynamic load balancing is performed, and then upstream load balancing is performed. Having too small an interval could result in cable modems being constantly moved to achieve balanced loads during peak usage times when traffic spikes are available. Please note that after making any load balance changes in the CLI configuration, the timer for the next DLB iteration is reset to 0.

Example

The following example sets the frequency for load balancing to every 900 seconds (15 minutes):

```
cable load-balance balancing-period 900
```

Related information

cable load-balance
cable load-balance exclude

cable load-balance fail-exclude-period-secs
cable load-balance move-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
clear cable load-balance
show cable load-balance
show cable load-balance exclude-list

cable load-balance block-period

Use the `cable load-balance block-period` command to configure daily time intervals when load-balancing will not be performed.

`cable load-balance block-period` *start-time end-time*

To remove the blocking of the load balancing, use the **no** form of the command:

```
no cable load-balance block-period
```

Syntax description

start-time	The time to start blocking load-balancing in hh:mm format. The time should be entered using the same time zone as that used by the CableOS Core server.
end-time	The time to end blocking load-balancing in hh:mm format. The time should be entered using the same time zone as that used by the CableOS Core server.

Default

The system default is that no blocking period is configured.

Command mode

Config mode.

Usage guidelines

Use the block-period configuration to prevent the load-balancing process from running during specific periods.

To change the time period for the blocking, you should first remove the current blocking using the **no** form of the command and then enter the new time period.

Examples

The following example prevents load-balancing from running between 9:30 pm and 11:00 pm:

```
cable load-balance block-period 21:30 23:00
```

The following example prevents load-balancing from running between 10:00 pm and 01:00 am:

```
cable load-balance block-period 22:00 23:59
```

```
cable load-balance block-period 00:00 01:00
```

Related information

cable load-balance

cable load-balance docsis-policy

Use the `cable load-balance docsis-policy` command to create a DOCSIS policy and associate an existing rule with the policy. Use the no form of the command to remove a DOCSIS policy or a rule from the policy.

`cable load-balance docsis-policy` *policy-id* [`rule` *rule-id*]
`no cable load-balance docsis-policy` *policy-id* [`rule` *rule-id*]

Syntax description

This command has no arguments or keywords.

policy-id	Specifies the DOCSIS policy to be created.
rule-id	Specifies the rule to be used with the DOCSIS policy.

Default

This command has no default value.

Command mode

Global config mode

Usage guidelines

Load balancing policies allow control over the behavior of the autonomous load balancing process on a per-CM basis.

A load balancing policy is described by a set of conditions (rules) that govern the autonomous load balancing process for the CM. When a load balancing policy is defined by multiple rules, all of the rules apply in combination.

During the registration process, the CMTS MUST assign the CM a load balancing policy ID. The policy ID may be assigned to a cable modem via the cable modem config file. The CMTS MUST assign the CM the load balancing policy ID provisioned in the config file and sent in the Registration Request, if it exists.

The CMTS MUST prohibit load balancing using a particular CM.

To exclude cable modem from DLB using TLV43.1, you must configure the following rule and policy and assign the configured policy ID in CM config:

NOTE: The modem will ONLY be excluded from balancing if the relevant `cable load-balance rule` is configured as "**disabled**".

```
cable load-balance docsis-policy
admin@CableOS(config)# cable load-balance docsis-policy 0
admin@CableOS(config-docsis-policy-0)# rule 1
admin@CableOS(config-rule-1)# commit
Commit complete.
```

General guidelines for the rules and policies:

- The policy or rule is recognized by a 32-bit ID
- Each cable modem can have one policy only
- Each rule can be associated to one or more policies
- Each policy is described by at least one rule, otherwise, it cannot be created
- When a policy is defined by multiple rules, all rules apply in combinations
- If the policy ID specified by the cable modem configuration file is not configured on CMTS, no LB prohibition is applied to that CM. However, after the policy with the matched ID is configured, LB prohibition takes effect immediately.

Examples

The following example sets policy 0 with rule 4294967295:

```
admin@CableOS(config)# cable load-balance docsis-policy 0 rule 4294967295
admin@CableOS(config-rule-4294967295)# commit
```

The following example shows the removal of policy 0:

```
admin@CableOS(config)# no cable load-balance docsis-policy 0
admin@CableOS(config)# commit
```

You cannot remove the last rule in a policy, as each policy must have at least one rule. Instead, simply remove the policy. The example below shows an attempt to remove the last rule:

```
admin@CableOS(config)# no cable load-balance docsis-policy 0 rule 4294967295
admin@CableOS(config)# commit
Aborted: too few 'cable load-balance docsis-policy 0 rule', 0 configured, at least 1
 must be configured
```

The following example shows how to set policy 0 with a disable rule:

```
admin@CableOS(config-rule-0)# cable load-balance rule 4294967295
admin@CableOS(config-rule-4294967295)# disabled
admin@CableOS(config-rule-4294967295)# commit
Commit complete.
```

```
admin@CableOS(config)# cable load-balance docsis-policy 0
admin@CableOS(config-docsis-policy-0)# rule 4294967295
admin@CableOS(config-rule-4294967295)# commit
Commit complete.
```

Related information

cable load-balance rule

show cable load-balance exclude-list

cable load-balance downstream frequency-setting dynamic-lb

Use the `cable load-balance downstream frequency-setting dynamic-lb` command to enable/disable downstream dynamic load balancing on the CMTS when TLV1 is present.

`cable load-balance downstream frequency-setting dynamic-lb` { `enabled` | `disabled` }

Syntax description

`enabled|disabled`	`enabled` Downstream dynamic load balancing is enabled. `disabled` Downstream dynamic load balancing is disabled.

Default

By default, Downstream dynamic load balancing is disabled when TLV1 is present.

Command mode

Config mode

Usage guidelines

In the output of the `show cable load-balance exclude-list` command, the Dynamic Load Balancing exclude reason for TLV1 is `DS Frequency Setting`.

Examples

The example below disables Downstream dynamic load balancing:

```
cable load-balance downstream frequency-setting dynamic-lb disabled
```

Related information

cable load-balance downstream frequency-setting static-lb

cable load-balance upstream channel-id-setting static-lb

cable load-balance upstream channel-id-setting dynamic-lb

show cable load-balance exclude-list

cable load-balance downstream frequency-setting static-lb

Use the `cable load-balance downstream frequency-setting static-lb` command to enable/disable downstream static load balancing on the CMTS when TLV1 is present.

`cable load-balance downstream frequency-setting static-lb { enabled | disabled }`

Syntax description

`enabled|disabled`	`enabled` Downstream static load balancing is enabled. `disabled` Downstream static load balancing is disabled.

Default

By default, Downstream static load balancing is disabled when TLV1 is present.

Command mode

Config mode

Usage guidelines

Disabling Downstream static load balancing via CLI when TLV1 is present has been implemented for DOCSIS 2.0 CMs only.

To enable Downstream static load balancing for DOCSIS 2.0 CMs when TLV1 is present, static load balancing for the DOCSIS 2.0 CMs must also be enabled under the MAC domain, using the `cable mac-domain * load-balance downstream static docsis20 enabled` command.

If static load balancing is enabled for DOCSIS 2.0 CMs and TLV1 exists, the CMs will be in the *init* state, as static load balancing uses the re-init technique for DCC.

Examples

The example below disables Downstream static load balancing:

```
cable load-balance downstream frequency-setting static-lb disabled
```

Related information

cable load-balance downstream frequency-setting dynamic-lb
cable load-balance upstream channel-id-setting static-lb
cable load-balance upstream channel-id-setting dynamic-lb
show cable load-balance exclude-list

cable load-balance downstream threshold min-chan-load-pct

Use the `cable load-balance downstream threshold min-chan-load-pct` command to specify the minimum utilization of non-primary downstream channel or bonding group (as percent of bandwidth) before it should be included in load balancing.

`cable load-balance downstream threshold min-can-load-pct` *percent*

Syntax description

`percent`	Utilization percentage.

Default

The default value is 25 percent.

Command mode

Config mode.

Usage guidelines

To avoid unnecessary movement of CMs, the utilization method should not perform load balancing until the amount of utilization on an interface exceeds a reasonable threshold. Note that the bonding group usually consists of SC-QAM non-primary, OFDM and SC-QAM primary channels that contain the overhead utilization related to DOCSIS traffic. In order to exclude the influence of the DOCSIS overhead, comparison with the threshold is performed only on QAM or OFDM channels. At least one non-primary channel in the downstream bonding group should exceed this threshold.

Example

The following example specifies the utilization percentage as 10:

```
cable load-balance downstream threshold min-chan-load-pct 10
```

Related information

cable load-balance balancing-period secs
cable load-balance exclude
cable load-balance fail-exclude-period-secs
cable load-balance move-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
clear cable load-balance
show cable load-balance
show cable load-balance exclude-list

cable load-balance downstream threshold min-load-diff-pct

Use the `cable load-balance downstream threshold min-load-diff-pct` command to specify the minimum downstream interfaces utilization difference that can exist between interfaces before the CMTS performs load balancing between these interfaces.

`cable load-balance downstream threshold min-load-diff-pct` *percent*

Syntax description

`percent`	The difference between downstream interfaces utilization as a percentage.

Default

The default value is 10 percent.

Command mode

Config mode.

Usage guidelines

You must take into account that in the case of downstream bonding groups, interfaces utilization is calculated as the average value of all the channels inside this bonding group. The default of 10 percent is the minimum recommended threshold. Do not set this threshold below 10 percent unless you have been instructed to do so by Harmonic support personnel.

For example, for two cable modems, if the cable load-balance downstream threshold min-load-diff-pct value is 10 percent, and downstream 1 is at 23 percent and downstream 2 is at 30 percent, no cable modems will be moved. However, if the load usage for downstream 2 reaches 33 percent, the CMTS begins load-balancing cable modems to downstream 1 until the difference in load usage between the two downstreams falls below 10 percent.

Example

The following example specifies the minimal load difference values as 15 percent:

```
cable load-balance downstream threshold min-load-diff-pct 15
```

Related information

cable load-balance balancing-period secs
cable load-balance exclude
cable load-balance fail-exclude-period-secs
cable load-balance move-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
clear cable load-balance
show cable load-balance
show cable load-balance exclude-list

cable load-balance downstream threshold min-stddev-improve-pct

Use the `cable load-balance downstream threshold min-stddev-inprove-pct` command to define the reasonable downstream channels bandwidth standard deviation enhancement to be achieved by load balancing.

`cable load-balance downstream threshold min-stddev-improve-pct` *percent*

Syntax description

`percent`	The reasonable enhancement ratio in percentage (0..10000)

Default

The default value is 1 percent.

Command mode

Config mode.

Usage guidelines

During the load balancing procedure, before sending downstream DBC/DCC requests to CMs, the load balancing algorithm first tries to estimate the maximum level of achievable enhancement in the upstream channels utilization distribution. This value can be estimated as the ratio of the new standard deviation to the previous standard deviation. If this estimation provides a value less than the user-defined value, DBC/DCC messages will not be sent. Note that downstream channels without cable modems are also taken into account during standard deviation calculations, so the influence of a single CM move may be very insignificant. If you see that there is big potential for moving cable modems, but as a result of DLB no moves have occurred, consider setting the downstream threshold min-stddev-improve-pct for downstream to a lower value.

Example

The following example defines the reasonable standard deviation enhancement as 15 percent:

```
cable load-balance downstream threshold min-stddev-improve-pct 15
```

Related information

cable load-balance balancing-period secs

cable load-balance exclude

cable load-balance fail-exclude-period-secs

cable load-balance move-exclude-period-secs

cable load-balance threshold deviation-enhancement

cable load-balance threshold load-value

cable load-balance threshold min-chan-load

clear cable load-balance

show cable load-balance

show cable load-balance exclude-list

cable load-balance exclude

Use the `cable load-balance exclude` command to exclude cable modems from load balancing operations altogether on the basis of their MAC address, organization unique identifier (OUI), or CPE device class. To end the exclusion, use the **no** form of the command.

`cable load balance exclude` { *modem mac-address* | *oui word* | *device-class* }

Syntax description

`modem mac-address`	The MAC address to be excluded from load balancing.
`oui word`	The organization unique identifier (OUI) (modem manufacturer) to be excluded from load balancing.
`device-class`	The CPE device class to be excluded from load balancing. The following device classes can be excluded: • eMTA (Multimedia Terminal Adapter) • eSTB (Set Top Box)

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

The `cable load-balance exclude` command allows you to specify that particular cable modems should not participate in one or more types of load-balancing operations. For example, this might be done for cable modems that are currently provisioned for premium services, for cable modems that do not respond appropriately to (DBC/DCC) or channel override messages, or for other reasons.

Examples

The following example excludes cable modems with MAC addresses 0014.0459.eede and fc52.8d5e.7eba from load balancing:

```
cable load-balance exclude modem 0014.0459.eede
cable load-balance exclude modem fc52.8d5e.7eba
```

The following example excludes all cable modems that have eMTA CPE from load balancing:

```
cable load-balance exclude device-class eMTA
```

Related information

cable load-balance

cable load-balance balancing-period secs

cable load-balance fail-exclude-period-secs

cable load-balance move-exclude-period-secs

cable load-balance threshold deviation-enhancement

cable load-balance threshold load-value

cable load-balance threshold min-chan-load

clear cable load-balance

show cable load-balance

show cable load-balance exclude-list

cable load-balance fail-exclude-period-secs

Use the `cable load-balance fail-exclude-period-secs` command to exclude cable modems from load balancing operations after they have failed a move operation, as a result of not being able to respond appropriately to (DBC/DCC) messages.

`cable load balance fail-exclude-period-secs` *interval*

Syntax description

`interval`	The period (in seconds) for how long modems that failed to be moved should be excluded from load balancing. The valid range of values is 0 - 40000.

Default

The default value for this period is 3600 seconds (60 minutes).

Command mode

Config mode.

Usage guidelines

If a CM failed a move operation, it means that potentially it has some problems with processing move requests or it is currently unable to perform the move request. If the CM failed to process a DBC/DCC message for any reason, there is a chance that it may repeat this behavior during the next iteration. Taking into account that failed operations may result in a complete loss of service on this CM, it is reasonable to exclude this CM from dynamic load balancing operations for a significant period of time. If you see that the same CM often appears in the *show cable load-balance exclude-list* command output with a fail reason, it is highly recommended to exclude this CM via the *cable load-balance exclude* command.

Example

The following example excludes all modems that failed to be moved from load balancing for the next 1800 seconds (30 minutes):

```
cable load-balance fail-exclude-period-secs 1800
```

Related information

cable load-balance
cable load-balance balancing-period secs
cable load-balance exclude
cable load-balance move-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
clear cable load-balance
show cable load-balance
show cable load-balance exclude-list

cable load-balance general default

Use the `cable load-balance general default` command to set default configuration values for general load balancing groups (GLBG).

`cable load balance general default control` *control* `init-tech` *name*

Syntax description

control	Enables/disables dynamic load balancing (DLB) for modems, which were assigned to a GLBG. The default value is **enabled**.
name	The initialization technique name: • reinit (0) • initial (1) • ranging (2) • station (3) The default value is **initial**. **IMPORTANT:** It is prohibited to configure the DLB init-tech greater than 1 if the BCM3160 revision is less than B2.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

This command affects the default configuration of all General Load Balancing Groups (GLBGs).

A General Load Balancing Group (GLBG) is a load balancing group, which is created automatically for every MAC domain. It includes all channels from all ports associated with the MAC domain and its fiber nodes (although CMs will be balanced only between channels of a single fiber node). The CM will be assigned to a GLBG if there is no service type specified for this CM, or if the CMTS failed to assign a CM to an RLBG with the requested service type.

For each GLBG, the CMTS generates a global load balancing group ID (LBG ID), which can be found using the *show cable modem load-balance group* command.

When you choose an initialization technique, take the following into consideration:

- reinit

  The use of this initialization technique (initialization technique 0 - reinitialize the MAC), results in the longest interruption of service. The CMTS MUST signal the use of this technique when QoS resources will not be reserved on the new channel(s), when the downstream channel of a DOCSIS 3.0 CM confirmed with Multiple Receive Channel Support is changed, or when the upstream channel of a DOCSIS 3.0 CM to which a Transmit Channel Configuration was assigned in the registration process is changed. The CMTS MUST use initialization technique 0 in DCC messages to DOCSIS 3.1 CMs. The CMTS MUST use initialization technique 0 in DCC messages to DOCSIS 3.0 CMs operating in Multiple Transmit Channel mode and Multiple Receive Channel mode.
- initial

  The use of this initialization technique (initialization technique 1 - broadcast initial ranging) may also result in a lengthy interruption of service. However, this interruption of service is mitigated by the reservation of QoS resources on the new channel(s). The service interruption can be further reduced if the CMTS supplies downstream parameter sub-TLV's and the UCD substitution TLV in the DCC-REQ in addition to providing more frequent initial ranging opportunities on the new channel.
- ranging

  The use of this initialization technique (initialization technique 2 - unicast ranging) offers the possibility of only a slight interruption of service In order to use this initialization technique, the CMTS MUST:

  - Synchronize timestamps (and downstream symbol clocks for S-CDMA support) across the downstream channels involved and specify SYNC substitution sub-TLV with a value of 1 if the downstream channel is changing.
  - Include the UCD substitution in the DCC message if the upstream channel is changing.

  However, the CMTS MUST NOT use this initialization technique if:

  - The DCC-REQ message requires the CM to switch between S-CDMA and TDMA
  - Propagation delay differences between the old and new channels will cause the CM burst timing to exceed the ranging accuracy requirements of DOCSIS PHY 3.1.
  - Attenuation or frequency response differences between the old and new upstream channels will cause the received power at the CMTS to be outside the limits of reliable reception.
- station

  The use of this initialization technique (initialization technique 3 - initial ranging or periodic ranging) offers the possibility of only a slight interruption of service. This value might be used when there is uncertainty when the CM may execute the DCC command and thus a chance that it might miss station maintenance slots. However, the CMTS MUST NOT use this initialization technique if the conditions for using the reinit and initial techniques are not completely satisfied.

Example

The following example enables the general load balance group and its initialization technique:

```
cable load-balance general default control enabled init-tech initial
```

Related information

cable load-balance
cable load-balance balancing-period secs
cable load-balance exclude
cable load-balance move-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
cable mac-domain * load-balance restricted
clear cable load-balance
show cable load-balance
show cable load-balance exclude-list
show cable load-balance group summary
show cable load-balance group restricted
show cable modem load-balance group

cable load-balance move-exclude-period-secs

Use the `cable load-balance move-exclude-period-secs` command to exclude cable modems from load balancing operations for a period after they have been moved.

`cable load balance move-exclude-period-secs` *interval*

Syntax description

`interval`	The period (in seconds) for how long modems that have recently been moved should be excluded from load balancing. The valid range of values is 0 - 40000.

Default

The default value for this command is 600 seconds (10 minutes).

Command mode

Config mode.

Usage guidelines

Any CM move operation leads to a temporary loss of service, as balancing the same cable modem too often may have a negative impact on the quality of service. It is recommended to define the value of the **move-exclude-period-secs** that will eliminate any noticeable loss of service for the end user, but will still allow for the improvement of global downstream and upstream channel bandwidth utilization distribution. This exclude period is common for both upstream and downstream directions.

Example

The following example excludes modems that have recently been moved for 900 seconds (15 minutes):

```
cable load-balance move-exclude-period-secs 900
```

Related information

cable load-balance
cable load-balance balancing-period secs
cable load-balance exclude
cable load-balance fail-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
clear cable load-balance
show cable load-balance
show cable load-balance exclude-list

cable load-balance restrict modem

Use the `cable load-balance restrict modem` command to configure a list of cable modems statically provisioned at the CMTS to a restricted load balancing group (RLBG) or a service type ID. To remove the configured list of cable modems, use the **no** form of this command.

`cable load-balance restrict modem` *index mac-addr*`[`*mac-mask*`]` `service-type-id` *string*

Syntax description

`index`	The rule index. It should be unique for creating new rules, and an existing index for changing existing rules. The valid range of values is 0 - 4294967295.
`mac-addr`	The MAC address of the modem (or modem subset) to which this rule should be applied, in the format of xxxx.xxxx.xxxx or XX:XX:XX:XX:XX:XX
`mac-addr-mask`	(Optional) The MAC address mask for the modem subset in the format of xxxx.xxxx.xxxx or XX:XX:XX:XX:XX:XX. This value should be used if the rule is needed to be applied to more than one modem.

`string`	The Service Type Id associated with this cable modem MAC address - MAC address mask combination that should be applied to the modem/modem subset.

Default

There is no default value for this command.

Command mode

Config mode.

Example

```
cable load-balance restrict modem 1 f0f2.4993.7ea8 ffff.ffff.ffff service-type-id
 test_2
```

Related information

cable load-balance

show cable load-balance

show cable load-balance group restricted

cable load-balance rule

Use the `cable load-balance rule` command to create a rule that prevents cable modems from disabling or enabling load balancing. Use the no form of the command to remove a defined rule.

`cable load-balance rule` *rule-id* { `disabled` | `enabled` }
`no cable load-balance rule` *rule-id*

Syntax description

This command has no arguments or keywords.

rule-id	Specifies the rule to load-balance the CM
`disabled`	Disables the CM from load balancing.
`enabled`	Enables load balancing on the CM.

Default

This command has no default value.

Command mode

Global config mode.

Usage guidelines

Load balancing policies allow control over the behavior of the autonomous load balancing process on a per-CM basis.

A load balancing policy is described by a set of conditions (rules) that govern the autonomous load balancing process for the CM. When a load balancing policy is defined by multiple rules, all of the rules apply in combination.

During the registration process, the CMTS MUST assign the CM a load balancing policy ID. The policy ID may be assigned to a cable modem via the cable modem config file. The CMTS MUST assign the CM the load balancing policy ID provisioned in the config file and sent in the Registration Request, if it exists.

The CMTS MUST prohibit load balancing using a particular CM.

To exclude cable modem from DLB using TLV43.1, you must configure the following rule and policy and assign the configured policy ID in CM config:

```
cable load-balance rule
admin@CableOS(config-rule-0)# cable load-balance rule 1
admin@CableOS(config-rule-1)# disabled
admin@CableOS(config-rule-1)# commit
Commit complete.
```

General guidelines for the rules and policies:

- The policy or rule is recognized by a 32-bit ID
- Each cable modem can have one policy only
- Each rule can be associated with one or more policies
- Each policy is described by at least one rule; otherwise it cannot be created
- When a policy is defined by multiple rules, all rules apply in combinations
- If the policy ID specified by the cable modem configuration file is not configured on CMTS, no LB prohibition is applied to that CM. However, after the policy with the matched ID is configured, LB prohibition takes effect immediately.

If a rule has been used in a policy, it cannot be removed. If you try to remove such a rule, you receive a message similar to this:

```
Aborted: illegal reference 'ccap docsis docs-load-balancing load-balancing-
policy 0 load-balance-rule 4294967295
      rule-id'
```

Examples

The example below sets rule 0 for enabling and rule 4294967295 for disabling:

```
admin@CableOS(config)# cable load-balance rule 0 enabled
admin@CableOS(config-rule-0)# commit
Commit complete.

admin@CableOS(config)# cable load-balance rule 4294967295 disabled
admin@CableOS(config-rule-4294967295)# commit
Commit complete.
```

The example below removes rule 0:

```
admin@CableOS(config)# no cable load-balance rule 0
admin@CableOS(config)# commit
Commit complete.
```

The example below removes all rules:

```
admin@CableOS(config)# no cable load-balance rule
admin@CableOS(config)# commit
Commit complete.
```

Related information

cable load-balance docsis-policy

show cable load-balance exclude-list

cable load-balance upstream channel-id-setting dynamic-lb

Use the `cable load-balance upstream channel-id-setting dynamic-lb` command to enable/disable upstream dynamic load balancing on the CMTS when TLV2 is present.

`cable load-balance upstream channel-id-setting dynamic-lb { enabled | disabled }`

Syntax description

`enabled|disabled`	`enabled` Upstream dynamic load balancing is enabled. `disabled` Upstream dynamic load balancing is disabled.

Default

By default, Upstream dynamic load balancing is disabled when TLV2 is present.

Command mode

Config mode

Usage guidelines

In the output of the `show cable load-balance exclude-list` command, the Dynamic Load Balancing exclude reason for TLV2 is `US Channel ID Setting`.

Examples

The example below disables Upstream dynamic load balancing:

```
cable load-balance upstream channel-id-setting dynamic-lb disabled
```

Related information

cable load-balance downstream frequency-setting dynamic-lb

cable load-balance downstream frequency-setting static-lb

cable load-balance upstream channel-id-setting static-lb

show cable load-balance exclude-list

cable load-balance upstream channel-id-setting static-lb

Use the `cable load-balance upstream channel-id-setting static-lb` command to enable/disable upstream static load balancing on the CMTS when TLV2 is present.

`cable load-balance upstream channel-id-setting static-lb` { `enabled` | `disabled` }

Syntax description

`enabled|disabled`	`enabled` Upstream static load balancing is enabled. `disabled` Upstream static load balancing is disabled.

Default

By default, Upstream static load balancing is disabled when TLV2 is present.

Command mode

Config mode

Usage guidelines

Disabling Upstream static load balancing via CLI when TLV2 is present has been implemented for DOCSIS 2.0 CMs only.

To enable Upstream static load balancing for DOCSIS 2.0 CMs when TLV2 is present, static load balancing for the DOCSIS 2.0 CMs must also be enabled under the MAC domain, using the `cable mac-domain * load-balance upstream static docsis20 enabled` command.

If static load balancing is enabled for DOCSIS 2.0 CMs and TLV2 exists, the CMs will be in the *init* state, as static load balancing uses the re-init technique for DCC.

Examples

The example below disables Upstream static load balancing:

```
cable load-balance upstream channel-id-setting static-lb disabled
```

Related information

cable load-balance downstream frequency-setting dynamic-lb

cable load-balance downstream frequency-setting static-lb

cable load-balance upstream channel-id-setting dynamic-lb

show cable load-balance exclude-list

cable load-balance upstream resets-before-exclude-on-dbc-timeout

Use the `cable load-balance upstream resets-before-exclude-on-dbc-timeout` command to specify the maximal number of times a CM may reset upon a DBC time out following an US dynamic load balancing attempted move before it is permanently excluded from US load balancing.

`cable load-balance upstream resets-before-exclude-on-dbc-timeout` { `count` *count* | `unlimited` }

Syntax description

count	The number of allowed resets. The default value is 2.
`unlimited`	Always allow resets.

Default

See the Syntax table.

Command mode

Global configuration mode

Usage guidelines

If CM failed to send DBC response or sent a DBC response with an error code following a US partial recovery DBC more than the configurable allowed number of times, that CM is permanently move to "passive" US partial recovery. This means that the CM will be granted IUC3 unicast and IUC4 opportunities instead of DBC requests to recover the partial channel. This command enables CLI configuration for the limit of resets due to US partial recovery failure.

Examples

The following example specifies the maximum number of resets allowed to 5:

```
cable load-balance upstream resets-before-exclude-on-dbc-timeout count 5
```

The following example does not limit the maximum number of resets allowed:

```
cable load-balance upstream resets-before-exclude-on-dbc-timeout unlimited
```

Related information

cable mac-domain * resets-on-us-partial-dbc-failure

cable load-balance upstream threshold min-chan-load-pct

Use the `cable load-balance upstream threshold min-chan-load-pct` command to specify the minimum utilization of the non-primary upstream channel or bonding group (as a percent of bandwidth) before it should be included in load balancing.

`cable load-balance upstream threshold min-can-load-pct` *percent*

Syntax description

`percent`	Utilization percentage.

Default

The default value is 25 percent.

Command mode

Config mode.

Usage guidelines

To avoid unnecessary movement of CMs, the utilization method should not perform load balancing until the amount of utilization on an interface exceeds a reasonable threshold. Note that the bonding group usually consists of SC-QAM non-primary, OFDM and SC-QAM primary channels that contain the overhead utilization related to DOCSIS traffic. In order to exclude the influence of the DOCSIS overhead, comparison with the threshold is performed only on QAM or OFDM channels. At least one non-primary channel in the upstream bonding group should exceed this threshold.

Example

The following example specifies the utilization percentage as 10:

```
cable load-balance upstream threshold min-chan-load-pct 10
```

Related information

cable load-balance balancing-period secs
cable load-balance exclude
cable load-balance fail-exclude-period-secs
cable load-balance move-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
clear cable load-balance
show cable load-balance
show cable load-balance exclude-list

cable load-balance upstream threshold min-load-diff-pct

Use the `cable load-balance upstream threshold min-load-diff-pct` command to specify the minimum upstream interfaces utilization difference that can exist between interfaces before the CMTS performs load balancing between these interfaces.

`cable load-balance upstream threshold min-load-diff-pct` *percent*

Syntax description

`percent`	The difference between upstream interfaces utilization as a percentage.

Default

The default value is 10 percent.

Command mode

Config mode.

Usage guidelines

You must take into account that in the case of upstream bonding groups, interfaces utilization is calculated as the average value of all the channels inside this bonding group. The default of 10 percent is the minimum recommended threshold. Do not set this threshold below 10 percent unless you have been instructed to do so by Harmonic support personnel.

For example, for two cable modems, if the cable load-balance upstream threshold min-load-diff-pct value is 10 percent, and upstream 1 is at 23 percent and upstream 2 is at 30 percent, no cable modems will be moved. However, if the load usage for upstream 2 reaches 33 percent, the CMTS begins load-balancing cable modems to upstream 1 until the difference in load usage between the two upstreams falls below 10 percent.

Example

The following example specifies the minimal load difference values as 15 percent:

```
cable load-balance upstream threshold min-load-diff-pct 15
```

Related information

cable load-balance balancing-period secs
cable load-balance exclude
cable load-balance fail-exclude-period-secs
cable load-balance move-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
clear cable load-balance
show cable load-balance
show cable load-balance exclude-list

cable load-balance upstream threshold min-stddev-improve-pct

Use the `cable load-balance upstream threshold min-stddev-inprove-pct` command to define the reasonable upstream channels bandwidth standard deviation enhancement to be achieved by load balancing.

`cable load-balance upstream threshold min-stddev-improve-pct` *percent*

Syntax description

`percent`	The reasonable enhancement ratio in percentage (0.. 10000)

Default

The default value is 1 percent.

Command mode

Config mode.

Usage guidelines

During the load balancing procedure, before sending upstream DBC/DCC requests to CMs, the load balancing algorithm first tries to estimate the maximum level of achievable enhancement in the upstream channels utilization distribution. This value can be estimated as the ratio of the new standard deviation to the previous standard deviation. If this estimation provides a value less than the user-defined value, DBC/DCC messages will not be sent. Note that upstream channels without cable modems are also taken into account during standard deviation calculations, so the influence of a single CM move may be very insignificant. If you see that there is big potential for moving cable modems, but as a result of DLB no moves have occurred, consider setting the upstream threshold min-stddev-improve-pct for upstream to a lower value.

Example

The following example defines the reasonable standard deviation enhancement as 15 percent:

```
cable load-balance upstream threshold min-stddev-improve-pct 15
```

Related information

cable load-balance balancing-period secs
cable load-balance exclude
cable load-balance fail-exclude-period-secs
cable load-balance move-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
clear cable load-balance
show cable load-balance

show cable load-balance exclude-list

cable mac-address aging-time

Use the `cable mac-address aging-time` command to set the aging time of offline cable modems. If any modem remains offline for more than the aging-time setting, the modem is removed from the CLI output and from multiple internal structures within one minute after the aging-time has elapsed. Use the **no** form of the command to delete the mac-address aging-time configuration.

`cable mac-address aging-time` *aging-time*
`no cable mac-address aging-time`

Syntax description

aging-time *aging-time*	<integer: 3600 seconds (one hour) to 604800 seconds (seven days)> Default 86400 seconds (one day) The maximum time a modem can remain offline before it is automatically removed from the CLI output and other internal structures: • When the aging-time limit is reached, the modem is removed within one minute

Default

86400 seconds (one day)

Command mode

Config mode.

Usage guidelines

There are no Usage Guidelines for this command.

Example

The following example illustrates setting the cable-modem aging-time to two days:

```
admin@CableOS(config)# cable mac-address aging-time 172800
admin@CableOS(config-mac-domain-1:10/0.0)#
```

cable mac-domain

Use the `cable mac-domain` command to create a MAC domain and enter the configuration mode for that MAC domain. Use the **no** form of the command to delete an individual MAC domain configuration.

`cable mac-domain` *mac-domain*
`no cable mac-domain` *mac-domain*

where *mac-domain* is *vc:vs/pp.d* (see the table below).

The system enters the specified MAC domain prompt:

```
mac-domain-vc:vs/pp.d)#
```

Use the template form `cable template mac-domain` to enter the global mac-domain configuration mode.

NOTE:

All simple MAC domain commands that do not require elaboration are listed in the following table. MAC domain commands that require further explanation, such as those that enter a sub-configuration mode, are described later.

The CableOS Core supports the configuration of up to four MAC domain templates.

The cable MAC domain configuration mode and template MAC domain configuration mode have the following sub-configuration modes:

- privacy: Enters mac-domain privacy sub-configuration mode with the prompt:
  - (md-template md-template privacy)#
- ds-bonding-group: Enters mac-domain ds-bonding-group sub-configuration mode with the prompt:
  - (mac-domain slot/mac-domain-id dbg dbg-name)#
- us-bonding-group: Enters mac-domain us-bonding-group sub-configuration mode with the prompt:
  - (mac-domain slot/mac-domain-id ubg ubg-name)#

Syntax description

mac-domain	The specific MAC domain in the format *vc:vs/pp.d* • vc: A configured cable chassis • vs: A slot number on that chassis • Range: <integer: 0...5, 8...13> 80G12 line card slot number • Range: <integer:0...254> Ripple1 virtual slot number When an 80G12 card is logically removed from the chassis with the command **no chassis** *nn* **slot** *ss*, the COS CORE automatically removes all **cable mac-domain** *vc:vs/p.d* configurations for that slot. • pp: A configured DS (downstream) RF port on that slot • Range: 0–11 • d: A configured MAC domain on that DS RF port • Range: <domain id 0 | 1 (future)>
`[admin-state]`	<enum: up | down> Administrative state of the MAC domain. A MAC domain must be **admin-state up** for proper operation. **Admin-state down** disables all DOCSIS output on the down-channels owned by the MAC domain and ignores all input on its us-phy-channels. However, the **down** state still allows (and verifies) all configuration involving the MAC domain.

bundle *bundle id*	<Integer: 1...127> The cable bundle that the MAC domain is assigned to. The cable bundle defines how traffic to and from the MAC domain is forwarded on NSI ports. [Recommended] Use the template form to place all MAC domains referencing the template in a single cable bundle. Must be performed when the MAC domain is administratively **down**. The cable bundle cannot be changed or deleted when the MAC domain is administratively **up**.
`[cm-status]`	<enum: enabled | disabled > Default **enabled** Enables/disables the DOCSIS CM status event reporting mechanism on the MAC domain.
`[concatenation]`	<enum: enabled | disabled > Default enabled Enables DOCSIS 1.1 concatenation of upstream transmissions on the MAC domain.
[ds-bonding-group] *dbg-name*	Enter cable mac-domain * ds-bonding-group sub-configuration mode to define a specific ds-bonding-group for a specific MAC domain or to override a ds-bonding group configuration in a referenced mac-domain template (see below, **[template** *md-template***]**). Use **cable template mac-domain ds-bonding-group** for global configuration of MAC domain ds-bonding groups.

[ds-non-primary-set *ds-channel-set*]	<string ds-channel-set: 0...255 characters> Default: empty (0-length string) Assigns as non-primary-capable a set of down-channels on the **ds-rf-port slot/port** configured for the MAC domain. The down-channels must exist in the **cable ds-rf-port slot/port** global configuration (or its referenced ds-rf-port template), and may be in any admin state (enabled or disabled). The down-channels must not be assigned to any other MAC domain or in the current Mac domain's **ds-primary-set** channel list. Example: `cable mac-domain ds-non-primary-set 9-11,13-15` The CableOS Core enforces that: • The **ds-primary-set** and **ds-non-primary-set** channels lists do not overlap • A channel is not referenced as **ds-primary-set** or **ds-non-primary-set** by more than one MAC domain • No more than 255 down-channels (primary or non-primary) are referenced by a MAC domain • A channel referenced by **cable [template] mac-domain ds-non-primary-set** is configured with **mode cmts**

ds-primary-set *ds-channel-set*	<string ds-channel-set:1...255 characters> (Mandatory) Assigns as primary-capable a set of down-channels on the **ds-rf-port slot/port** configured for the MAC domain. The down-channels must exist in the **cable ds-rf-port slot/port** global configuration (or its referenced ds-rf-port template), and may be in any **admin-state**. The down-channels must not be assigned to any other MAC domain or in the current MAC domain's **ds-non-primary-set** channel list. The COS CORE enforces that an administratively **up** MAC domain has at least one administratively **up** primary-capable channel. The COS CORE maintains a **No Primary-capable Downstream Channel** major alarm when a MAC domain is administratively **up** and all of its primary-capable down-channels are not **up** (**down** or **testing**). The COS CORE supports defining up to 16 ds-primary channels on a ds-rf-port. Example: `template mac-domain md-template ds-primary-set 0-7,8,12` The COS CORE enforces that: • The **ds-primary-set** and **ds-non-primary-set** channel lists do not overlap. • A channel is not referenced as **ds-primary-set** or **ds-non-primary-set** by more than one MAC domain. • No more than 255 down-channels (primary or non-primary) are referenced by a MAC domain. • A channel referenced by **mac-domain [template] ds-primary-set** is configured with **mode cmts**.
`[im-interval-msec]`	<integer milliseconds: 20...1000> Default 200 (Harmonic-specific) The interval of time, in milliseconds, between each broadcast Initial Maintenance (IM) grant, which is used to allow new cable modems to join the network.
`[invited-ranging-attempts]`	<enum: integer: 0...1024> Default 16 (Harmonic-specific) The maximum number of attempts to make on invitations for ranging requests. A value of **0** (zero) configures the CableOS Core to attempt to range forever.

`[ip-provisioning-mode]`	<enum: ipv4-only | ipv6-only | alternate | dual-stack> Default ipv4-only (Harmonic-specific) This attribute configures the IP provisioning mode for a MAC domain: • ipv4-only: The CM will acquire a single IPv4 address for the CM management stack • ipv6-only: The CM will acquire a single IPv6 address for the CM management stack • alternate: The CM will acquire a single IPv6 address for the CM management stack and, if failures occur, the CM will fall back to provisioning and operation with an IPv4 address • dual-stack: The CM will acquire both an IPv6 and IPv4 address for provisioning and operation
`[mdd-interval-msec]`	<integer: milliseconds 100...2000> Default 2000 Configures the interval for the insertion of MAC Domain Descriptor (MDD) messages in each downstream channel of a MAC domain
`[mtc-mode]`	<enum: enabled | disabled> Default enabled Enables/disables Multiple Transmit Channel mode on the MAC domain; this mode is required for DOCSIS 3.0 upstream channel bonding.
`privacy`	Enter **cable MAC Domain privacy** sub-configuration mode.
`[res-grp-base]`	<integer: 0...2^32-1> Default 0 Base value of the *res-grp-id* computed for the restricted load balancing groups defined in a MAC domain template referenced by the MAC domain (see below, **[template** *md-template***]**). The COS CORE rejects any configuration that causes an overlap of a nonzero *res-grp-id* on the chassis.
`[sm-interval-sec]`	<integer: seconds 1...30> Default 14 Station Maintenance (SM) interval, in seconds. Nominal interval within which the CableOS Core schedules a SM interval (IUC 4) for at least one of the upstream channels of a cable modem
`[source-verify]`	<enum: enabled | disabled> Default enabled Enables/disables Source Address Verification of upstream traffic on the MAC domain.

`[sync-interval-msec]`	<integer: milliseconds 1...200> Default 200 (Harmonic Specific) The interval between successive transmissions of a SYNC message on each primary-capable downstream channel of the MAC domain.
[template *md-template*]	Refers to an existing **mac-domain template** *md-template*. Default: no template Use this to override specified parameter settings in the referenced md-template. The MAC domain template to which an individual MAC domain refers specifies a set of down-channel indices and us-phy-channel indices. These identify a particular set of down-channel and us-phy-channels on the ds-rf-port and eligible us-rf-ports determined by the **ds-rf-port** *slot/port* setting of the MAC domain and the **cable fiber-node** topology configuration.
`[ucd-interval-msec]`	<integer milliseconds: 1...2000> Default 500 (Harmonic-specific) The interval between CMTS transmission of successive Upstream Channel Descriptor messages for each upstream channel on the MAC domain.
[us-bonding-group] *ubg-name*	Enter cable mac-domain * us-bonding-group sub-configuration mode to define a specific us-bonding-group for a specific MAC domain or to override a us-bonding group configuration in a referenced mac-domain template (see below, **[template** *md-template***]**). Use **cable template mac-domain us-bonding-group** for global configuration of mac-domain ds-bonding groups.
`[us-frequency-range]`	<enum: standard | extended> Default standard Controls what the CableOS Core CMTS advertises in MDD messages for the upper edge of an upstream physical channel: • standard: Standard Frequency Range • extended: Extended Frequency Range as defined in DOCSIS.

`us-phy-channel-set`	<string us-phy-channel-set: 1...255 characters> (Mandatory) In a MAC domain template expansion, the us-phy-channel-set is expanded to each of the ULC (Upstream Line Card) ports **ulc-slot/port** reached by the fiber-nodes to which the **ds-rf-port dlc-slot/port** of the expanding MAC domain is split. When using MAC domain templates, all ULC ports used by a MAC domain must use the same us-phy-channel set. A MAC domain is said to “use” a us-rf-port when that us-rf-port is configured in **cable fiber-node** as reached by the **ds-rf-port dlc-slot/dlc-port** configured for the MAC domain. The COS CORE enforces that the same us-phy-channel indices and frequencies are defined for all us-rf-ports used by a MAC domain. The COS CORE CLI enforces that an administratively **up** MAC domain has at least one administratively **up** us-phy-channel on all of its used us-rf-ports. A MAC domain uses all of the us-logical-channels on the us-phy-channels assigned to it. The COS CORE maintains a **No Upstream Logical Channel** major alarm when a MAC domain is administratively **up** and all of the us-logical-channels on any us-rf-port are used by the MAC domain. Example: `us-phy-channel-set 0-2` The COS CORE enforced that no more than 255 us-phy-channels total (on all used us-rf-ports) are referenced by the MAC domain.

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

A DOCSIS MAC domain consists of a set of downstream DOCSIS channels (**down-channels** and **ofdm-channels**) and upstream logical channels (**us-logical-channels**). Using the template form eliminates the need to duplicate the same MAC domain configuration for multiple CM-SG (CM Service Group) combinations of ds-rf-ports and us-rf-ports.

For the CableOS Core, all the downstream channels of a MAC domain must be on the same DS RF port (defined as **ds-rf-port** in CLI), which is the named vc:vs/pp of the MAC domain. The MAC domain template **md-template** referenced by the individual MAC domain selects the generic channel-indexes of a ds-rf-port that are used by that MAC domain.

In most CMTS deployments, all the DOCSIS channels on a ds-rf-port can be configured in the same MAC domain, in which case the only MAC domain **d** configured on the port is **.0**. In some deployments however, a subset of CMs may be required to use particular downstream and upstream channels. In this case, a separate set of downstream (and upstream) channels must be configured for a separate MAC domain for that CM subset. Currently, the CableOS Core supports configuration of one MAC domain per CM service group, **.d=.0** and **.d=.1**.

The cable MAC domain configuration works in conjunction with the **cable fiber-node** and **template mac-domain** configurations to select the individual US (upstream) logical channels (**us-logical-channels** in CLI) in a MAC domain. The **cable fiber-node** configuration determines the set of US RF ports (**us-rf-ports** in CLI) eligible to contain the upstream channels of the MAC domain; these are the us-rf-ports reached upstream by the fiber-nodes to which the MAC domain's ds-rf-port is split. The **template mac-domain** configuration identifies a set of us-phy-channels on the eligible us-phy-ports. The MAC domain then uses all the us-logical-channels on those identified us-phy-channels.

The CableOS System requires the upstream RF signal from a fiber-node to be connected to a single us-rf-port. When a MAC domain contains channels from multiple us-rf-ports, each of the us-rf-ports uses the same us-phy-channel indexes of the MAC domain template, that is, the same upstream frequency plan. A CM can transmit upstream on up to 12 us-phy-channels on a single us-rf-port.

The **cable fiber-node** configuration enforces that the set of fiber-nodes to which a ds-rf-port is split (the downstream service-group or DS-SG) be connected to us-rf-ports on the same 80G12 line card. The set of one or more fiber-nodes connected to a single us-rf-port is called an upstream service group or US-SG. The CableOS Core supports configuration of the upstream combining up to four fiber-nodes to a single us-rf-port.

For deployment of DOCSIS high-speed data service to subscribers, it is recommended that ds-rf-ports be split to only one or two CM service groups, that is, for a MAC domain to use one ds-rf-port and either one or two us-rf-ports. For deployments of an IPTV broadcast-only service, the CableOS Core supports a fiber-node topology that splits a ds-rf-port to up to 12 CM service groups. A MAC domain can therefore use from one to 12 us-rf-ports, all of which must be on the same 80G12 line card.

Currently, the CableOS Core supports the configuration of only one MAC domain on a single ds-rf-port, and only one ds-rf-port per MAC domain. That MAC domain includes the upstream us-phy-channels of its corresponding us-rf-ports configured as reached by the ds-rf-port in the **cable fiber-node** configuration. An 80G12 line card may therefore control as few as one MAC domain (with an IPTV broadcast-only topology) or as many as 12 MAC domains, a different one for each upstream RF port. The maximum of 12 MAC domains per 80G12 line card is sufficient to define one MAC domain for each service group.

Example

The following example illustrates entering the MAC domain configuration for the specific MAC domain **1:10/0.0**:

```
admin@CableOS(config)# cable mac-domain 1:10/0.0
admin@CableOS(config-mac-domain-1:10/0.0)#
```

Related information

cable template mac-domain

cable mac-domain-address-oui

cable mac-domain-address-oui

Use the `cable mac-domain-address-oui` command to set the prefix of the MAC domain source MAC address.

`cable mac-domain-address-oui` *oui*

Syntax description

oui	The first 3 bytes of the MAC domain source MAC address, in "XX:XX:XX" format. The default value is "00:90:f0".

Command mode

Config mode.

Usage guidelines

Changing the OUI will take effect only after recreating the MAC domain. It is done by setting the MAC domain admin state to **down**, committing, then setting it to **up**, and committing.

Until this is done, the behavior is unpredictable - modems will continue to work on the previous mac-oui, until they re-register - and then some of them will fail. To warn the user, an event will display in the CLI after commit:

```
MAC domain address OUI change to 'xx:xx:xx is service-affecting. In order to
 regain service, all mac domains must be set to admin-state down, commit, set
 to admin-state up and then commit.
```

Example

The following example sets the MAC domain OUI to 00:00:f0:

```
admin@CableOS(config)# cable mac-domain-address-oui 00:00:f0
```

Related information

cable mac-domain

cable mac-domain * controller dynamic-bg

Use the `cable mac-domain * controller dynamic-bg` command to configure the number of channels to be used in the upstream dynamic bonding groups.

`cable mac-domain` *md-name* `controller dynamic-bg us-bg-sizes` *sizes*

Syntax description

`md-name`	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/upstream RF port of the MAC domain • *d* identifies a MAC domain on the rf-port, which for the current release must be 0
`sizes`	The number of channels that can be used in the dynamic bonding group, in a comma-separated list or a range of sizes. OFDMA channels are automatically added to the dynamically created bonding groups and do not need to be specified in the size parameter. For example, if you have 4 channels and 1 OFDMA channel, define the size as 4.

Default

There are no default values for this command.

Command mode

Config mode.

Examples

```
cable mac-domain 1:0/0.0controller dynamic-bg us-bg-sizes 4,8
```

Related information

cable template mac-domain

cable mac-domain * us-dynamic-bonding-group

show cable dynamic-bonding-group

cable mac-domain * controller dynamic-us-mod-prof-hopping

Use the `cable mac-domain * controller dynamic-us-mod-prof-hopping` command to configure the profile to control dynamic upstream modulation hopping.

`cable mac-domain` *md-name* `dynamic-us-mod-prof-hopping` [`admin-state` *state*] [`algorithm-calculate-period-sec` *algorithm-calculate-period-seconds*] [`readings-measurement-period-sec` *readings-measurement-period*] [`hysteresis-db` *hysteresis*] [`last-measurement-down-weight` *last-measurement-down-weight*] [`last-measurement-up-weight` *last-measurement-up-weight*] [`algorithm-down-trigger-mode` *algorithm-down-trigger*] [`algorithm-up-period-factor` *algorithm-up-period*] [`fec-threshold-up-factor` *fec-threshold-up*]

Syntax description

`md-name`	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/ upstream RF port of the MAC domain • *d* identifies a MAC domain on the rf-port, which for the current release must be 0
state	Optional enumerated value {*up*|*down*}. The default value is **down**.
algorithm-calculate-period-seconds	The number of seconds in between checking current FEC and SNR state and the configured thresholds and making a decision whether or not the profile should be switched (in any direction). The default value is **30**.
readings-measurement-period	The number of seconds in between reading measurements. The default value is **20**.
hysteresis	The hysteresis in dB. The valid range is from 0.0..100.0 and the default value is **3.0**.
last-measurement-down-weight	The percentage weight to be allocated to the last down measurement. The default value is **20**.
last-measurement-up-weight	The percentage weight to be allocated to the last up measurement. The default value is **4**.
algorithm-down-trigger	This parameter sets how sensitive the system will be to FEC changes in the down direction. Choose between {*fec-and-snr*|*fec-or-snr*} The default value is *fec-and-snr*. • *fec-or-snr*: If either FEC or SNR fail their threshold conditions, the profile will be degraded to the more robust modulation • *fec-and-snr*: Only if both FEC and SNR fail their threshold conditions, the profile will be degraded to the more robust modulation
algorithm-up-period	This parameter defines the minimum number of measurements required before moving to a higher capacity modulation. This means that the minimal period is (algorithm-calculate-period-sec * algorithm-up-factor). The default value is **1**.

fec-threshold-up	This parameter defines the FEC percentage hysteresis factor for moving up to a higher capacity modulation. This value is factoring the configured FEC thresholds as defined under the corresponding upstream channels ('us-phy-channel [] us-logical-channel [] threshold corr-fec-pct [] uncorr-fec-pct []'). This means that while the condition for downgrade depends on corr-fec-pct and uncorr-fec-pc,the condition for upgrade depends on the factored thresholds, corr-fec-pct*fec-threshold-up and uncorr-fec-pct*fec-threshold-up. The valid range is from 0.0 .. 1.0 and the default value is **1.0**. Meaning that by default the FEC statistics thresholds for downgrade and upgrade are equal.

Default

All parameters are optional. If no parameters are entered, the system uses the default values as described in the Syntax section.

Command mode

Config mode.

Usage guidelines

Examples

```
admin@CableOS(config)# cable mac-domain 1:0/0.0 controller dynamic-us-mod-prof-
hopping algorithm-down-trigger-mode fec-or-snr
admin@CableOS(config)# cable mac-domain 1:0/0.0 controller dynamic-us-mod-prof-
hopping algorithm-up-period-factor 10
admin@CableOS(config)# cable mac-domain 1:0/0.0 controller dynamic-us-mod-prof-
hopping fec-threshold-up-factor 0.7
```

cable mac-domain * dbc-active-call

Use the `cable mac-domain * dbc-active-call` command to enable or disable Dynamic Bonding Change (DBC) while the modem has active voice calls.

`cable mac-domain` *md-name* `dbc-active-call` [{ *disabled* | *enabled* }]

Syntax description

`md-name`	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/ upstream RF port of the MAC domain • *d* identifies a MAC domain on the rf-port, which for the current release must be 0
`dbc-active-call` *disabled/enabled*	Enables/disables the feature. The feature is enabled by default

Default

By default, DBC is enabled when there are active voice calls.

Command mode

Config mode

Usage guidelines

When DBC is enabled when there are active voice calls, the system's behavior is unchanged.

When DBC is disabled when there are active voice calls, the following DBC messages will not be sent:

- US partial recovery
- DS partial recovery
- Manual DBC or DCC from CLI, SNMP or ulc-debug

The partial recovery DBCs will be re-scheduled to a later time. If the voice call is still active, they will be postponed again.

The manual DBC/DCC will return an error message:

```
Failed: CM has a voice call in progress
```

For manual DBCs and DCCs, the disabling of DBC/DCC when there are active calls can be overriden by using the *force* parameter.

Examples

The example below disables DBC during active voice calls for MAC Domain 1:0/0.0

```
cable mac-domain 1:0/0.0 dbc-active-call disabled
```

Related information

test cable dbc

test cable dcc

cable mac-domain * dbc-ds-partial-recovery

Use the `cable mac-domain * dbc-ds-partial-recovery` command to define how to perform downstream partial recovery using DBC.

`cable mac-domain` *md-name* `dbc-ds-partial-recovery` [{ *disabled* | *enabled* }] [`reset-cm-on-dbc-timeout` { *disabled* | *enabled* }] [`retry-period-sec` *period*] [`holdoff-interval-sec` *interval*]

Syntax description

`md-name`	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/ upstream RF port of the MAC domain • *d* identifies a MAC domain on the rf-port, which for the current release must be 0
`dbc-ds-partial-recovery`*disabled/ enabled*	Enables/disables the feature. The feature is enabled by default
`reset-cm-on-dbc-timeout`*disabled/ enabled*	Enables/disables CM reset after a DBC timeout. By default, this is disabled.
`retry-period-sec`*period*	Retry period between DBC attempts. The valid range is 120..3600 and the default value is 600.
`holdoff-interval-sec`*interval*	Holdoff interval before attempting DS recovery via DBC. The valid range is30..3600 and the default value is 600.

Command mode

Config mode

Usage guidelines

When the modem gets in partial service on DS channels it sends a specific CM-STATUS events (for example, CM-STATUS Event 1 - Secondary Channel MDD timeout). On that kind of behavior the recovery mechanism timer will be started. After the expiry of the timer, a DBC-REQ will be sent to the modem to drop inactive channels from modem's RCS (Receive Channel Set). After the inactive channels have been dropped from the modem's RCS, the timer is restarted, but now to restore the channels that were dropped. Currently, the default time for the timer expiration is 10 minutes (600 seconds), which gives the modem a chance to recover inactive channels by itself.

Examples

The example below enables the feature, enables CM reset by DBC, sets the holdoff interval to 5 minutes (300 seconds) and the retry period to three minutes (180 seconds)

```
cable mac-domain 1:0/0.0 dbc-ds-partial-recovery enabled reset-cm-on-dbc-timeout
 enabled retry-period-sec 180 holdoff-interval-sec 300
```

Related information

cable mac-domain * dbc-us-partial-recovery

cable mac-domain * dbc-us-partial-recovery

Use the `cable mac-domain * dbc-us-partial-recovery` command to define how to perform upstream partial recovery using DBC.

`cable mac-domain` *md-name* `dbc-us-partial-recovery` [{ *disabled* | *enabled* }] [`retry-period-sec` *period*]

Syntax description

`md-name`	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/ upstream RF port of the MAC domain • *d* identifies a MAC domain on the rf-port, which for the current release must be 0
`dbc-ds-partial-recovery`*disabled/ enabled*	Enables/disables the feature. The feature is enabled by default
`retry-period-sec`*period*	Retry period between DBC attempts in seconds. The valid range is 180..3600 and the default value is 600.

Default

By default the feature is enabled and the retry period is 600 seconds (10 minutes).

Command mode

Config mode

Usage guidelines

When dynamically re-enabling the feature, it will start working on CMs that will go into partial when the service starts after the reconfiguration. CMs that are already in US partial will not be recovered unless the CM is reset or another channel will go into US partial.

The minimum period range of 3 minutes is due to DOCSIS constraints. The maximum period range is set to 1 hour. If you need to configure a recovery period of more then 1 hour, it is preferable to disable the feature.

Examples

The example below enables the feature and sets the retry period to five minutes (300 seconds):

```
cable mac-domain 1:0/0.0 dbc-us-partial-recovery enabled retry-period-sec 300
```

Related information

cable mac-domain * dbc-ds-partial-recovery

cable mac-domain * diplexer-band-edge

Use the `cable mac-domain * diplexer-band-edge` command to configure the TLV 21 value.

`cable mac-domain` *md-name* `diplexer-band-edge control` { `enabled` | `disabled` } [`upstream-upper-band-edge-mhz` *upstream-upper-band-edge*] [`downstream-lower-band-edge-mhz` *downstream-lower-band-edge*] [`downstream-upper-band-edge-mhz` *downstream-upper-band-edge*]

Syntax description

`md-name`	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/ upstream RF port of the MAC domain • *d* identifies a MAC domain on the rf-port, which for the current release must be 0
`control`	`{enabled|disabled}` This parameter is used to enable or disable sending of TLV 21 as part of MDD. If the value is set to disabled - TLV 21 will not be sent. The default value is `enabled`.

upstream-upper-band-edge	This parameter is used to configure the diplexer upstream upper band edge. If the parameter is not present in the configuration and the diplexer-band-edge control is set to enabled, the value for TLV 21 will be calculated automatically depending on upstream channels configuration. Otherwise, the configured value will be sent. By default this field is not present in configuration. Valid values: 42 | 65 | 85 | 117 | 204
downstream-lower-band-edge	This parameter is used to configure the diplexer downstream lower band edge. If the parameter is not present in configuration and the diplexer-band-edge control is set to enabled, the value for TLV 21 will be calculated automatically depending on downstream channels configuration. Otherwise, the configured value will be sent. By default this field is not present in configuration. Valid values: 108 | 258
downstream-upper-band-edge	This parameter is used to configure the diplexer downstream upper band edge. If the parameter is not present in configuration and the diplexer-band-edge control is set to enabled, the value for TLV 21 will be calculated automatically depending on downstream channels configuration. Otherwise, the configured value will be sent. By default this field is not present in configuration. Valid values: 1002 | 1218 | 1794

Default

By default, the diplexer band edge is enabled with no values for the edges.

Command mode

Config mode.

Usage guidelines

There are following validations are performed for the diplexer-band-edge parameters.

- The `upstream-upper-band-edge-mhz` and the `downstream-lower-band-edge-mhz` cannot overlap. The operator cannot configure the upstream upper band higher than the downstream lower band edge
- The `upstream-upper-band-edge-mhz` must be higher than the configured frequency of US channels within this mac-domain
- The `downstream-lower-band-edge-mhz` must be lower than the configured frequency of DS channels within this mac-domain
- The `downstream-upper-band-edge-mhz` must be higher than the configured frequency of DS channels within this mac-domain

Examples

The example below shows a default configuration:

```
admin@CableOS> show running-config cable mac-domain 1:0/0.0 diplexer-band-edge
cable mac-domain 1:0/0.0
 diplexer-band-edge control enabled
!
```

The example below shows a valid configuration of band edges:

```
admin@CableOS(config)# cable mac-domain 1:0/0.0 diplexer-band-edge control enabled
 downstream-lower-band-edge-mhz 108 downstream-upper-band-edge-mhz 1002 upstream-
upper-band-edge-mhz 85
admin@CableOS(config-mac-domain-1:0/0.0)# commit
Commit complete.
admin@CableOS(config-mac-domain-1:0/0.0)#
admin@CableOS> show running-config cable mac-domain 1:0/0.0 diplexer-band-edge
cable mac-domain 1:0/0.0
 diplexer-band-edge control     enabled
 diplexer-band-edge upstream-upper-band-edge-mhz 85
 diplexer-band-edge downstream-lower-band-edge-mhz 108
 diplexer-band-edge downstream-upper-band-edge-mhz 1002
```

The example below shows an invalid configuration where the Downstream and Upstream bands overlap:

```
admin@CableOS(config-mac-domain-1:0/0.0)# diplexer-band-edge upstream-upper-band-
edge-mhz 204 downstream-lower-band-edge-mhz 108
admin@CableOS(config-mac-domain-1:0/0.0)# commit
Aborted: Diplexer upstream and downstream bands overlap
admin@CableOS(config-mac-domain-1:0/0.0)#
```

The example below shows an invalid configuration where the Upstream upper edge is lower than the configured frequencies of the Upstream channels:

```
admin@CableOS(config)# do show running-config cable us-rf-port 1:0/0 us-phy-channel
 frequency-mhz
cable us-rf-port 1:0/0
 us-phy-channel 0
  frequency-mhz 20.0
 !
 us-phy-channel 1
  frequency-mhz 26.4
 !
 us-phy-channel 2
  frequency-mhz 32.8
 !
 us-phy-channel 3
```

```
   frequency-mhz 39.2
  !
  us-phy-channel 4
   frequency-mhz 45.6
  !
  us-phy-channel 5
   frequency-mhz 52.0
  !
  us-phy-channel 6
   frequency-mhz 58.4
  !
  us-phy-channel 7
   frequency-mhz 64.8
  !
 !
admin@CableOS(config)# cable mac-domain 1:0/0.0 diplexer-band-edge upstream-upper-
band-edge-mhz 42
admin@CableOS(config-mac-domain-1:0/0.0)# commit
Aborted: 'diplexer-band-edge 1:0/0.0': configured diplexer-band-edge upstream-upper-
band-edge is lower than channel 3 frequency (39200000 Hz)
admin@CableOS(config-mac-domain-1:0/0.0)#
```

The example below shows an invalid configuration where the Downstream lower edge is higher than the configured frequencies of the Downstream channels:

```
admin@CableOS(config)# cable mac-domain 1:0/0.0 diplexer-band-edge downstream-lower-
band-edge-mhz 258
admin@CableOS(config-mac-domain-1:0/0.0)# commit
Aborted: 'diplexer-band-edge 1:0/0.0': configured diplexer-band-edge downstream-
lower-band-edge is higher than channel 0 frequency (123000000 Hz)
```

cable mac-domain * ds-bonding-group

In either **cable mac-domain** or **cable template mac-domain** configuration mode, enter the following command to enter a sub-configuration mode to a ds-bonding-group (DBG or downstream bonding group) for an individual MAC domain or for a template global configuration of ds-bonding-groups:

`ds-bonding-group` *port-dbg-name*

The ds-bonding-group sub-configuration mode displays the following prompt:

`(mac-domain slot/mac-domain-id dbg dbg-name)#`

To delete a down-channel, enter the following command in either cable ds-rf-port or cable template ds-rf-port configuration mode:

`no ds-bonding-group` *port-dbg-name*

Syntax description

port-dbg-name	<string port-dbg-name: 1...4 characters> Mandatory A short name for the bonding group unique on a ds-rf-port. The format of the port-dbg-name is **DsL**, where: • D = The upper-case letter “**D**” for Downstream • s = The size of the bonding group (the number of channels) • L = A (case-insensitive) alphabetic letter in the range **A** through **H** that identifies one of eight downstream bonding groups of the indicated size on the ds-rf-port This format identifies the direction and number of channels, for example, **D4A**, **D4B**, and so on, for downstream bonding groups of 4 channels. The name is limited to only 4 characters for brevity in the `show` command output. Creating the ds-bonding-group initiates the **mac-domain [template] ds-bonding-group** sub-configuration mode. The CableOS Core supports defining up to 32 ds-bonding-groups on a ds-rf-port.
`[admin-state]`	<enum: enabled | disabled> Default disabled Administrative state of the DBG. The DBG admin-state must be **enabled** in order for the CableOS Core to use it. Setting the admin-state to **disabled** while modems are registered causes the CableOS Core to de-register all CMs with service flows assigned to the DBG.

down-channel-set *ds-channel set*	*ds-channel-set* is a character string (described in *cable mac-domain*) that identifies a list of down-channels on the **ds-rf-port slot/port** configured for the MAC domain.
	This setting defines a configured downstream bonding group (DBG) for use by the CMs registered on the MAC domain.
	Example:
	cable template mac-domain *md-template*
	`ds-primary-set 0-7,8,12`
	`ds-non-primary-set 9-11,13-15`
	`ds-bonding-group D4A down-channel-set 0-3`
	`ds-bonding-group D4B down-channel-set 4-7`
	`ds-bonding-group D4C down-channel-set 8-11`
	`ds-bonding-group D4D down-channel-set 12-13`
	`ds-bonding-group D8A down-channel-set 0-7`
	`ds-bonding-group D8B down-channel-set 8-15`
	The CableOS Core does not support all possible combinations of ds-bonding-groups, but only ones that it can feasibly schedule.
	A set of ds-bonding-groups is considered "feasibly scheduled" when no DBG has more than two distinct partially-overlapping channel subsets with the other DBGs.
	The CableOS Core enforces that all channels in the ds-channel-set are referenced by either the ds-primary-set or ds-non-primary-set channels of the MAC domain.
	Not all channels in the ds-primary-set and ds-non-primary-set groups may be configured in a ds-bonding-group.
	Note that DOCSIS standard Receive Channel Templates require bonding groups of 4 or fewer channels to be within a 72 MHz frequency range.

[ds-traffic-profile *qos-prof-name*]	<string: qos-prof-name 1...15> Name of a ds-traffic-profile. Assigns the ds-traffic-profile that configures how traffic is scheduled among downstream QoS classes on the bonding group.

`[provisioned-attr-mask]`	<bits: bitname[,bitname]…> Default 0 where bitname is one of the following: • bonded, low-latency, high-availability, reserved-3, reserved-4, … reserved-15, operator-16, operator-17, … operator-31. This string is converted into a 32-bit Provisioned Attribute Mask for the bonding group.
`[resequencing-wait-msec]`	<decimal: 0.0 to 18.0 milliseconds | -1> Default -1, Resolution 0.1 milliseconds The DSID Resequencing Wait Time in milliseconds that is to be used for all DSIDs associated with this Downstream Bonding Group. The value **-1** indicates that the DSID Resequencing Wait Time is determined by the CMTS.
`warning-threshold-msec`	<milliseconds: 0.0 to 17.9 | -1> Default -1, Resolution 0.1 milliseconds The DSID Resequencing Warning Threshold in milliseconds that is to be used for all DSIDs associated with this Downstream Bonding Group. The value **-1** indicates that the DSID Resequencing Warning Threshold is determined by the CMTS. The value **0.0** indicates that the threshold warnings are disabled. When the value of this object is not equal to **0** or **-1**, the CableOS Core enforces that the value of this object is less than the value of DSID Resequencing Wait Time (see **[resequencing-wait-msec]**, above in this table).

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

See the descriptions in the Syntax description for usage guidelines.

Related information

cable template mac-domain

cable mac-domain * ds-dynamic-bonding-group

Use the `cable mac-domain * ds-dynamic-bonding-group` command to enable and disable downstream dynamic bonding groups for a MAC domain.

`cable mac-domain` *md-name* `ds-dynamic-bonding-group` [{ *disabled* | *enabled* }]

Syntax description

md-name	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/upstream RF port of the MAC domain • *d* identifies a MAC domain on the rf-port, which for the current release must be 0
disabled | *enabled*	Disables and enables the feature

Default

There are no default values for this command.

Command mode

Config mode.

Usage guidelines

During configuration, combinations of DBGs of all regular sizes: 4,8,16,24,32 will be created and they will be tiled.

DBGs will be recalculated after the following triggers:

- The enabling/disabling of the dynamic DBG feature
- The creation of a MAC domain with dynamic DBG enabled
- Changing channels in the MAC domain (number of them or their frequencies)
- Disabling and re-enabling of the feature should recalculate the entire set of DBGs (but will drop all CMs on the MAC domain)

Example

```
cable mac-domain 1:0/0.0 ds-dynamic-bonding-group disabled
```

Related information

cable template mac-domain

cable mac-domain * controller dynamic-bg

cable mac-domain * us-dynamic-bonding-group

show cable dynamic-bonding-group

cable mac-domain * eae

Use the `cable mac-domain * eae` command to control the Early Authentication and Encryption (EAE) enforcement policy on a MAC domain.

`cable mac-domain` *md-name* `eae` *policy-name*

Syntax description

md-name	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream RF port of the MAC domain, as configured with *cable ds-rf-port vc:vs/pp* • *d* identifies a MAC domain on the ds-rf-port, which for the current release must be 0.
policy-name	The name of an EAE enforcement policy can be one of the following: • disabled: No EAE enforcement, EAE is disabled, and the CMTS does not enforce EAE on any CM • capability: Capability-Based EAE Enforcement, the CMTS enforces EAE on CMs that range with a B-INIT-RNG-REQ MAC message in which the EAE capability flag is set • ranging: Ranging-Based EAE Enforcement, that is, the CMTS enforces EAE on CMs that range with a B-INIT-RNG-REQ MAC message • total: Total EAE Enforcement, the CMTS enforces EAE on all CMs. The default is **disabled**.

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

Early authentication functions as a network admission control; only authenticated CMs are allowed to continue their initialization process and may be subsequently admitted to the network.

The results of a successful authentication are used for securing subsequent steps in the CM’s initialization process.

Early Authentication and Encryption (EAE) refers to the following sequence of processes in their entirety:

1. The authentication of the CM (the BPI+ Authorization exchanges) following the completion of ranging and before DHCP exchanges (early authentication).
2. TEK key exchanges for the CM’s Primary SAID.
3. Encryption of IP provisioning traffic and the REG-REQ-MP MAC message during CM initialization.

Examples

The following examples display how to configure different EAE enforcement policies:

```
admin@CableOS(config)# cable mac-domain 1:10/0.0 eae capability
admin@CableOS(config)# cable mac-domain 1:10/0.0 eae ranging
admin@CableOS(config)# cable mac-domain 1:0/0.0 eae total
```

Related information

cable privacy eae-exclude

cable mac-domain * force-dpd-time-advance

Use the `cable mac-domain * force-dpd-time-advance` command to enable a 500ms delay between sending the OFDM Downstream Profile Descriptor (DPD) to the CM and the DPD over GCP to the RPD.

`cable mac-domain` *md-name* `force-dpd-time-advance` { `enabled | disabled` }

Syntax description

md-name	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream RF port of the MAC domain, as configured with *cable ds-rf-port vc:vs/pp* • *d* identifies a MAC domain on the ds-rf-port, which for the current release must be 0.
`enabled	disabled`	`enabled` turns on the 500 ms delay `disabled` turns off the 500 ms delay

Default

By default, the delay is disabled.

Command mode

Config mode

Usage guidelines

DPD allows the CMTS to communicate the parameters of Downstream Profiles to cable modems (such as default modulation, subcarrier assignments, etc), as described in section 6.4.41 of the DOCSIS "MAC and Upper Layer Protocols Interface Specification".

The use case is when OFDM modulation profile is in use and being reconfigured dynamically, for example the OFDM modulation profile C is changed from 4K to 2K. The Core should start sending new DPD messages with the updated configuration change count to modems at least 500 ms prior to sending the new configuration to RPD via GCP. As DPD messages are sent every 500 ms, enabling the delay means that sending updated DPD messages can be delayed by an additional 500ms. This delay between configuration changes and sending the DPD message over GCP is 1000ms, which gives a guaranteed 500ms delay between sending the updated DPD to the CM and the updated DPD over GCP.

When the CM uses SC-QAM and OFDM channels and the OFDM channel is overloaded by DS traffic, if you change the OFDM data profile default modulation to a higher modulation (for example, from qam1024 to qam2048), you will see a traffic gap of 6-8 seconds duration caused by a non-synchronous reconfiguration between the services on Core side and the RPD.

Examples

The following example enables the delay for mac-domain 100:0/0:

```
admin@CableOS(config)# cable mac-domain 100:0/0 force-dpd-time-advance enabled
```

cable mac-domain * load-balance restricted

Use the `cable mac-domain * load-balance restricted` command to configure a restricted load balancing group (RLBG).

`cable mac-domain` *md-name* `load-balance restricted` *rlbg-cfg-index* `down-channel-set` *down-channel-set* `up-channel-set` *up-channel-set* `ofdm-channel-set` *ofdm-channel-set* `ofdma-channel-set` *ofdma-channel-set* `control` *control* `init-tech` *init-tech* `service-type-list` *service-type-list*

Syntax description

rlbg-cfg-index	Decimal index of RLBG in the context of MAC domain configuration. Value is in the range from 1 to 15.
down-channel-set	A comma-separated list of DS SC-QAM channels, which are included in this RLBG. By default, the list is empty.
up-channel-set	A comma-separated list of US SC-QAM logical channels, which are included in this RLBG. By default, the list is empty.
ofdm-channel-set	A comma-separated list of DS OFDM channels, which are included in this RLBG. By default, the list is empty.

ofdma-channel-set	A comma-separated list of US OFDMA channels, which are included in this RLBG. By default, the list is empty.
control	Enables/disables dynamic load balancing (DLB) for modems that were assigned to this RLBG. The default value is **enabled**.
init-tech	The initialization technique to be used by DLB. The options are: • reinit (0) • initial (1) • ranging (2) • station (3) **IMPORTANT:** It is prohibited to configure the DLB init-tech greater than 1 if the BCM3160 revision is less than B2.
service-type-list	A comma-separated list of service type IDs. Each service type ID is a string of up to 17 characters. Multiple RLBGs can support the same service type. By default, the list is empty.

Default

There is no default for this command. Default values are shown in the Syntax description table.

Command mode

Config mode.

Usage guidelines

Use this command to configure restricted load balancing groups (RLBG). RLBGs are used to restrict a CM to a particular set of channels. Up to 15 RLBGs can be configured for each MAC domain. For each RLBG configuration entry, CMTS generates a global LBG ID, which can be found in the *show cable load-balance group summary* command.

On CM registration, the CMTS reads the service type ID (STID) from REG-REQ. If STID is specified, the CMTS tries to assign the CM to an RLBG that supports this service type. If there are multiple RLBGs that support the requested service type, the CMTS balances the CM between all of the channels of these RLBGs by the number of CMs on each channel, taking into account attribute masks, if presented. If the STID is missing, or if there is no compatible DCS or UCS that matches a single RLBG with the requested service type, the CMTS assigns the CM to the GLBG of the corresponding MAC domain.

On every DLB iteration, the CM may be moved only between channels that are included in its assigned RLBG channel sets.

If the channel set of RLBG is changed while there are already assigned CMs, they will continue to operate on the current channels until the next iteration of DLB.

To remove the restriction, delete the RLBG using the **no** form of the command. If the RLBG is removed from the configuration, CMs assigned to this RLBG will stay operational, but will be excluded from DLB. To re-enable DLB for the excluded CMs, reset them or configure RLBG with the same index.

As load balancing uses DBC to move modems between bonding groups and channels, there is a limitation for downstream load balancing on primary downstream change. If the operator configured the ranging or station init-tech to be used with DLB, and as a result of DLB the modem will be moved to another downstream bonding group, and this move will cause the CM's primary downstream channel to be changed, then the initial initialization technique will be used, regardless of the configuration. There are no limitations on upstream load balancing.

When you choose an initialization technique, consider the following:

- reinit

  The use of this initialization technique (initialization technique 0 - reinitialize the MAC), results in the longest interruption of service. The CMTS MUST signal the use of this technique when QoS resources will not be reserved on the new channel(s), when the downstream channel of a DOCSIS 3.0 CM confirmed with Multiple Receive Channel Support is changed, or when the upstream channel of a DOCSIS 3.0 CM to which a Transmit Channel Configuration was assigned in the registration process is changed. The CMTS MUST use initialization technique 0 in DCC messages to DOCSIS 3.1 CMs. The CMTS MUST use initialization technique 0 in DCC messages to DOCSIS 3.0 CMs operating in Multiple Transmit Channel mode and Multiple Receive Channel mode.
- initial

  The use of this initialization technique (initialization technique 1 - broadcast initial ranging) may also result in a lengthy interruption of service. However, this interruption of service is mitigated by the reservation of QoS resources on the new channel(s). The service interruption can be further reduced if the CMTS supplies downstream parameter sub-TLV's and the UCD substitution TLV in the DCC-REQ in addition to providing more frequent initial ranging opportunities on the new channel.
- ranging

  The use of this initialization technique (initialization technique 2 - unicast ranging) offers the possibility of only a slight interruption of service. To use this initialization technique, the CMTS MUST:

  - Synchronize timestamps (and downstream symbol clocks for S-CDMA support) across the downstream channels involved and specify SYNC substitution sub-TLV with a value of 1 if the downstream channel is changing.
  - Include the UCD substitution in the DCC message if the upstream channel is changing.

  However, the CMTS MUST NOT use this initialization technique if:

  - The DCC-REQ message requires the CM to switch between S-CDMA and TDMA
  - Propagation delay differences between the old and new channels will cause the CM burst timing to exceed the ranging accuracy requirements of DOCSIS PHY 3.1.
  - Attenuation or frequency response differences between the old and new upstream channels will cause the received power at the CMTS to be outside the limits of reliable reception.
- station

  The use of this initialization technique (initialization technique 3 - initial ranging or periodic ranging) offers the possibility of only a slight interruption of service. This value might be used when there is uncertainty when the CM may execute the DCC command and thus a chance that it might miss station maintenance slots. However, the CMTS MUST NOT use this initialization technique if the conditions for using the reinit and initial techniques are not completely satisfied.

Example

The following example shows a typical configuration:

```
admin@CableOS(config)# cable mac-domain 1:10/11.0 load-balance restricted 1
admin@CableOS(config-restricted-1)# down-channel-set 0,4,8,12,16,20,24,28
admin@CableOS(config-restricted-1)# us-channel-set 0-7.0
admin@CableOS(config-restricted-1)# ofdm-channel-set 0,1
admin@CableOS(config-restricted-1)# ofdma-channel-set 0,1
admin@CableOS(config-restricted-1)# control enabled
admin@CableOS(config-restricted-1)# service-type-list svc_type1,svc_type2
```

Related information

cable template mac-domain

cable load-balance general default

show cable load-balance group summary

show cable load-balance group restricted

show cable modem load-balance group

cable mac-domain * map-advance

Use the `cable mac-domain * map-advance` command to configure map advance behavior.

`cable mac-domain` *mac-domain* `map-advance` { *static* | *dynamic* } `measurements` { *enabled* | *disabled* } `extra-usec` *usec*

Syntax description

mac-domain	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream RF port of the MAC domain, as configured with *cable ds-rf-port vc:vs/pp* • *d* identifies a MAC domain on the ds-rf-port, which for the current release must be 0.
`map-advance`	*static*: The map-advance delay is controlled by the user. This is the default. *dynamic*: The map-advance delay is controlled by an algorithm.

`measurements`	*enabled*: Trigger latency measurements to the RPD. *disabled*: Do not trigger latency measurements to the RPD. This is the default. When the `map-advance` is in dynamic mode, this field is ignored and measurements are enabled.
`extra-usec` *usec*	The default value is 100. This is the permanent value used when map-advance is in static mode. When map-advance is in dynamic mode, this is the initial value used when the system starts, before using the values calculated by the algorithm using the values defined with the `cable mac domain * map-advance algorithm` command.

Default

See the Syntax Description section for defaults.

Command mode

Config mode

Usage guidelines

The map advance can be defined as dynamic or static; the default is static. If the map advance is static, the advance delay is controlled by the user. If the map advance is dynamic, the map advance is controlled by an algorithm. The parameters for the algorithm are defined using the `cable mac-domain * map-advance algorithm` command.

The gathering of DLMs is activated in the following two cases:

- map-advance **measurement** is enabled.
- map-advance is set to **dynamic** mode. In this case the **measurement** field is ignored.

Dynamic Map Advance (DMA) is configured per MAC-domain and is activated if map-advance is set to dynamic mode. In this case the measurement field is ignored.

Examples

To enable the automatic setting of map-advance, map-advance should be configured into dynamic mode. This example enables the automatic map-advance setting. Once dynamic mode is set, the automatic setting will kick in. The initial map-advance that will be used is the map-advance configured with the `cable mac-domain * map-advance extra-usec` command.

```
admin@CableOS(config)# cable mac-domain md1:0/0.0 map-advance dynamic
```

To disable the automatic setting of map-advance, map-advance should be configured into static mode (the default value). This example enables the static map-advance setting. When static mode is set, the map-advance that will be used is the map-advance configured with the `cable mac-domain * map-advance extra-usec` command.

```
admin@CableOS(config)# cable mac-domain md1:0/0.0 map-advance static
```

To enable latency measurements, enable measurement as shown in the following example. If automatic mode is enabled, measurement will be triggered regardless of the measurement configuration field.

```
admin@CableOS(config)# cable mac-domain md1:0/0.0 map-advance measurements enabled
```

Related information

show cable latency history

show cable map-advance

show cable map-advance history

cable mac-domain * map-advance algorithm

snmp-server enable traps core md-map-advance-changed

cable mac-domain * map-advance algorithm

Use the `cable mac-domain * map-advance algorithm` command to define the parameters that control latency measurements, when the map-advance behavior is defined as dynamic.

`cable mac-domain` *mac-domain* `map-advance algorithm` [`measurement-interval-sec` *measurements-interval*] [`num-measurements` *num-measurements*] [`min-measurements` *min-measurements*] [`max-up-change-usec` *max-up-change*] [`max-down-change-usec` *max-down-change*] [`min-abs-change-usec` *min-abs-change*]

Syntax description

mac-domain	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream RF port of the MAC domain, as configured with *cable ds-rf-port vc:vs/pp* • *d* identifies a MAC domain on the ds-rf-port, which for the current release must be 0.

measurements-interval	The DLM algorithm execution interval in seconds. Default: **15** seconds In every interval, the algorithm will do the following: • Trigger measurement to the DP • Fetch measurement from the DP • Calculate latency • Apply a new map-advance if needed
num-measurements	The number of measurements used to calculate the latency. Default: **32** This parameter affects the sensitivity to the latest measurement. In the default case, the delay is calculated by the maximum value of the last 32 measurements.
min-measurements	The minimum number of measurements used to calculate the latency. Default: **1** Below that value, the algorithm will not calculate any delay and will trigger no change in map-advance. The *min-measurements* value cannot be larger than the *num-measurements* value.
max-up-change	The maximum allowed change by the algorithm when **increasing** the map-advance per algorithm interval. It is used to limit the velocity to move up. Default: **20000** microseconds. This parameter affect how quickly the system reacts to a latency increase in the network. As **20000** microseconds is the maximum value that the CMTS supports, it means the map-advance delay will be increased to the maximum value available to make the best effort to prevent any CM flap.

max-down-change	The maximum allowed change by the algorithm when **decreasing** the map-advance per algorithm interval. It is used to limit the velocity to move down. Default: **500** microseconds.
min-abs-change	The minimum absolute allowed change by the algorithm when increasing or decreasing the map-advance per algorithm interval. It is used to limit the number of map-advance changes in case the change is not big enough. Default: **100** microseconds. The *min-abs-change* value cannot be larger than the *max-up-change* value and cannot be larger than the *max-down-change* value.

Default

See the Syntax Description section for defaults.

Command mode

Config mode

Usage guidelines

DLM stands for **D**epi **L**atency **M**easurement. It is a specific data packet used to measure the network latency between the CCAP core and the RPD. It measures the latency between the core and the ingress point in the RPD.

DMA stands for **D**ynamic **M**ap **A**dvance and it runs above DLM. Based on the system configuration and measurements received by DLM it automatically sets the map-advance delay. It makes the system self recoverable when there are changes in the network delay and negates the need for the Operator to have to statically configure map-advance. **It does not guarantee** CMs will not be lost but can prevent or reduce the time CMs will be offline.

The gathering of DLMs is activated in the following two cases:

- map-advance **measurement** is enabled.
- map-advance is set to **dynamic** mode. In this case the **measurement** field is ignored.

Dynamic Map Advance (DMA) is configured per MAC-domain and is activated if map-advance is set to dynamic mode. In this case the measurement field is ignored.

When map-advance is set to automatic mode, DLM algorithm kicks in and controls the map-advance delay setting.

NOTE: High Availability

The only value replicated between the servers is the actual map-advance delay. Measurements are not replicated. An HA event should be treated as restarting the DLM algorithm. The active map-advance will be the last set value. This means that only when the *min-measurements* value is reached will the algorithm start the automatic setting of map-advance after the HA event.

Related information

show cable latency history

show cable map-advance

show cable map-advance history

cable mac-domain * map-advance

snmp-server enable traps core md-map-advance-changed

cable mac-domain * mcast-channel-set

Use the `cable mac-domain * mcast-channel-set` command to configure the multicast channel for a specific MAC domain.

`cable mac-domain` *md-name* `mcast-channel-set admin-state` *admin-state* `[ resequencing-wait-msec` *resequencing-wait-msec* `] [ warning-threshold-msec` *warning-threshold-msec* `]` `down-channel-set` *down-channel-set*

Syntax description

md-name	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream RF port of the MAC domain, as configured with *cable ds-rf-port vc:vs/pp* • *d* identifies a MAC domain on the ds-rf-port, which for the current release must be 0.
admin-state	Configured administrative state of the multicast channel. Setting this attribute to **up** enables operation of all multicast functions on the channel. Setting this attribute to **down** configures the CableOS Core to not use the multicast functions but still permits configuration of its other attributes.
resequencing-wait-msec	Optional This attribute provides the DSID Resequencing Wait Time in hundredMicroseconds that is to be used for all DSIDs associated with this Downstream Group. The value of 255 indicates that the DSID Resequencing Wait Time is determined by the CMTS. The valid range is 0-255.

warning-threshold-msec	This attribute provides the DSID Resequencing Warning Threshold in hundredMicroseconds that is to be used for all DSIDs associated with this Bonding Group. The value of 255 indicates that the DSID Resequencing Warning Threshold is determined by the CMTS. The value of 0 indicates that the threshold warnings are disabled. When the value of DsidReseqWaitTime is not equal to 0 or 255, the CCAP will ensure that the value of this object is either 255 or less than the value of DsidReseqWaitTime. The valid range is 0-255.
down-channel-set	The set of downstream channels to be used to forward multicast traffic.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

Examples

```
cable mac-domain 1:1/9.0
 mcast-channel-set
  admin-state            up
  resequencing-wait-msec 15.0
  warning-threshold-msec 12.0
  down-channel-set       4-8
```

Related information

cable mcast

show cable multicast

cable mac-domain * privacy

In either cable mac-domain or cable template mac-domain configuration mode, enter the following command to enter the privacy sub-configuration mode:

```
privacy
```

The ds-bonding-group sub-configuration mode displays the following prompt:

```
(md-template md-template privacy)#
```

Syntax description

[auth-lifetime-secs]	integer seconds: 1800..604800, 0> Default 0 (not configured) This is an optional per-mac-domain configuration for an internal “Default Tek Lifetime” value that the COS CORE maintains for each mac-domain. This value is 0 when not configured. If this per-mac-domain CLI configuration is not configured, the COS CORE uses the globally configured value of “**cable privacy tek-lifetime** *seconds*” as the “Default Tek Lifetime” for the mac-domain. If the global configuration is absent, the factory default is 43200 seconds (12 hours). When a CM initially registers, the COS CORE sets an internal “per-CM Tek Lifetime” value for a CM to its current value of “Default Tek Lifetime” for the CM’s mac-domain.
[tek-lifetime-secs]	<integer seconds: 86400..6048000, 0> Default 0 This is an optional per-mac-domain configuration for an internal “Default Auth Lifetime” value that the COS CORE maintains for each mac-domain. This value is 0 when not configured. If this per-mac-domain CLI configuration is 0, the COS CORE uses the globally configured value of “**cable privacy auth-lifetime** *seconds*” as the “Default Auth Lifetime” for the mac-domain. If the global value is not configured, the factory default auth lifetime is 604800 seconds (one week). When a CM initially registers, the COS CORE sets an internal “per-CM Auth Lifetime” value for a CM to its current value of “Default Auth Lifetime” for the CM’s mac-domain.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

See the descriptions in the Syntax description for usage guidelines.

cable mac-domain * ranging-abort-max-tx

Use the `cable mac-domain * ranging-abort-max-tx` command to enable/disable the RngMaxPwrAbrt option on the MULPI side instead of using a parameter in the **/etc/ulc-mulpi/mulpicf.xml** configuration file.

`cable mac-domain` *md-name* `ranging-abort-max-tx` *enabled* **|** *disabled*

Syntax description

`md-name`	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream RF port of the MAC domain, as configured with *cable ds-rf-port vc:vs/pp* • *d* identifies a MAC domain on the ds-rf-port, which for the current release must be 0.
`ranging-abort-max-tx`	The flag that defines if the feature is active or not. By default, the feature is enabled, so that modems that transmit with high tx power are forced to disconnect..

Default

By default, this command is enabled.

Command mode

Config mode

Usage guidelines

Use this command to turn on/off the mechanism of aborting CM-ranging on high Tx power.

Examples

Use the disable option to allow CMs in MAC domain 1:0/0.0 to remain online when transmitting with high Tx power:

```
cable mac-domain 1:0/0.0 ranging-abort-max-tx disabled
```

cable mac-domain * rcp use-learned

Use the `cable mac-domain * rcp use-learned` command to control whether the CMTS will use verbose RCP definitions reported by the cable modem during cable modem registration or during the DBC procedure.

`cable mac-domain` *md-name* `rcp use-learned` *mode*

Syntax description

md-name	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream RF port of the mac-domain, as configured with *cable ds-rf-port vc:vs/pp* • *d* identifies a MAC domain on the ds-rf-port, which for the current release must be 0.
mode	The mode can be one of the following: • enabled: During cable modem registration or during the DBC procedure, the CMTS will use the verbose RCP definitions learned from the CM. • disabled: During cable modem registration or during the DBC procedure, the CMTS will not use the verbose RCP definitions learned from the CM. The default is **disabled**.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

This configuration option can be used to restrict the usage of proprietary (manufacturer) RCP definitions in the case of complicated proprietary RCP definitions that contain RCP TLVs not supported or poorly supported by the CMTS.

Examples

The following examples display how to configure different use learned RCP modes:

```
admin@CableOS> show running-config cable mac-domain 1:0/0.0 rcp use-learned
cable mac-domain 1:0/0.0
 use-learned disabled
!
admin@CableOS> config
admin@CableOS(config)# cable mac-domain 1:0/0.0 rcp use-learned enabled
admin@CableOS(config-mac-domain-1:0/0.0)# commit
Commit complete.
admin@CableOS(config-mac-domain-1:0/0.0)# top
admin@CableOS(config)# exit
admin@CableOS> show running-config cable mac-domain 1:0/0.0 rcp use-learned
cable mac-domain 1:0/0.0
 use-learned enabled
```

```
!
admin@CableOS>
```

Related information

cable rcp

cable mac-domain * rcp verbose

show cable rcp

cable mac-domain * rcp verbose

Use the `cable mac-domain * rcp verbose` command to control how the cable modem will report RCP TLVs ("DOCSIS 3.1 MULPI: C.1.5.3 CM Receive Channel (RCP/RCC) Encodings") to the CMTS.

`cable mac-domain` *md-name* `rcp verbose` *mode*

Syntax description

md-name	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream RF port of the mac-domain, as configured with *cable ds-rf-port vc:vs/pp* • *d* identifies a MAC domain on the ds-rf-port, which for the current release must be 0.
mode	The mode can be one of the following: • enabled: The cable modem provides verbose reporting of Receive Channel Profiles. • disabled: The cable modem does not provide verbose reporting of all its Receive Channel Profiles. Generally, this means that the Cable modem will send only the RCP ID. The default is **disabled**.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

This configuration option is used to let the CMTS learn proprietary (manufacturer) RCP definitions that can be later used by the cable modem during registration or DBC procedure.

Examples

The following examples display how to configure different RCP verbose modes:

```
admin@CableOS> show running-config cable mac-domain 1:0/0.0 rcp verbose
cable mac-domain 1:0/0.0
 rcp verbose disabled
!
admin@CableOS> config
admin@CableOS(config)# cable mac-domain 1:0/0.0 rcp verbose enabled
admin@CableOS(config-mac-domain-1:0/0.0)# commit
Commit complete.
admin@CableOS(config-mac-domain-1:0/0.0)# top
admin@CableOS(config)# exit
admin@CableOS> show running-config cable mac-domain 1:0/0.0 rcp verbose
cable mac-domain 1:0/0.0
 rcp verbose enabled
!
admin@CableOS>
```

Related information

cable rcp

cable mac-domain * rcp use-learned

show cable rcp

cable mac-domain * rfog-mode

Use the `cable mac-domain * rfog-mode` command to enable RFoG on a specific MAC domain.

`cable mac-domain` *md-id* `rfog-mode { enabled | disabled }`

Syntax description

md-id	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs*identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/ upstream RF port of the mac-domain • *d* identifies a MAC domain on the rf-port, which for the current release must be 0

Default

By default, RFoG is disabled.

Command mode

Config mode.

Usage guidelines

For every us-port in the MAC domain, the following validation is done:

- For all us-phy-channels belonging to the port, the width-mhz must be the same
- For all us-log-channels belonging to the port, the slot-size must be the same
- For all us-log-channels belonging to the port, the modulation-profile must be the same

NOTE: Validation will only be done on a us-phy-channel that is in admin-state up.

Example

Refer to the User Guide for further information.

cable mac-domain * shared-secret

Use the `cable mac-domain * shared-secret` command to configure, for a MAC domain, an authentication shared-secret encryption key that cable modems must use to successfully process the DOCSIS configuration file and register with the CMTS. Use the **no** form of this command to disable the shared-secret encryption key on a MAC domain.

`cable mac-domain` *mac-domain* `shared-secret index` { `0 | 7` } *authentication-key*
`cable mac-domain` *mac-domain* `no shared-secret`

Syntax description

`0|7`	Specifies that an unencrypted (0) or encrypted (7) message will follow. Regardless of the input form, the key is always stored in encrypted form.
authentication-key	The authentication key to be configured for the MAC domain. <string: length 1...64>. A string of arbitrary printable characters.

Default

There is no default value for this command.

Command mode

Config mode.

Examples

The following example configures an unencrypted shared secret for authentication key **qwerty** on MAC domain 1:10/0.0:

```
admin@CableOS(config)# cable mac-domain 1:10/0.0
admin@CableOS(config-mac-domain-1:10/0.0)# shared-secret 0 qwerty
```

The following example disables the shared secret authentication key on MAC domain 1:10/0.0:

```
admin@CableOS(config)# cable mac-domain 1:10/0.0
admin@CableOS(config-mac-domain-1:10/0.0)# no shared-secret
```

Related information

cable mac-domain * shared-secondary-secret

cable mac-domain * shared-secondary-secret

Use the `cable mac-domain * shared-secondary-secret` command to configure one or more secondary shared-secret keys that CMs on this MAC domain can use to successfully process the DOCSIS configuration file and register with the CMTS. Use the **no** form of this command to remove secondary shared secrets.

`cable mac-domain` *mac-domain* `shared-secondary-secret index` *index-num* `{0 | 7}` *authentication-key*
`cable mac-domain` *mac-domain* `no shared-secondary-secret`

Syntax description

index-num	<integer index: 1...16> Identifies one of 16 possible shared secret keys. When the COS Core verifies a CM registration request, it checks its Message Integrity Code (MIC) against all configured authentication keys.
`0|7`	Specifies that an unencrypted (0) or encrypted (7) message will follow. Regardless of the input form, the key is always stored in encrypted form.
authentication-key	Text string specifying the shared secret string. The text string can be any arbitrary string up to 80 characters in length.

Default

No secondary shared secret is used.

Command mode

Config mode.

Usage guidelines

The `cable mac-domain * shared-secondary-secret` command can be used to supplement the `cable mac-domain * shared-secret` command so as to prevent unauthorized interception and alteration of the DOCSIS configuration file that is downloaded to the CM during the registration process. The DOCSIS specification allows for a CM and CMTS to use a shared secret (a secret encryption string) to calculate the MD5 Message Integrity Check (MIC) value for the DOCSIS configuration file that is downloaded to the CM.

The CM must use the proper shared secret encryption string to successfully decrypt and process the configuration file, and then register with the CMTS. If the CM does not have the proper encryption string, it will be unable to calculate the proper MIC value, and the `show cable modem` command will show reject(m) for the modem to indicate a MIC authentication failure.

The `cable mac-domain * shared-secondary-secret` command allows a cable operator to specify up to 16 alternate DOCSIS shared secrets. If a CM has a MIC authentication failure during registration, the CMTS then checks the MIC values using the alternate shared secrets. If a match is found, the CM is allowed online. If none of the alternate MIC values match the value returned by the CM, the CMTS refuses to allow the CM to come online.

The use of secondary shared secrets allow the MSO to gradually phase in changes to the shared secret key. If a shared secret has been compromised, or if the MSO decides to regularly change the shared secret, the MSO can use the `cable mac-domain * shared-secret` command to immediately change the primary shared secret. The previous key can then be made a secondary shared secret, using the `cable mac-domain * shared-secondary-secret` command, so that CMs can continue to register until the MSO can change all of the DOCSIS configuration files to use the new shared secret.

To use the secondary shared-secret feature, you must do the following:

You must specify a shared secret with the `cable mac-domain * shared-secret` command. The `cable mac-domain * shared-secondary-secret` command has no effect if you have not specified a primary shared secret. Note: At any particular time, the majority of CMs should use the primary shared secret to avoid excessive registration times.

Create DOCSIS configuration files that use the shared-secret encryption string to create the MD5 MIC value.

Use the `cable mac-domain * shared-secondary-secret` command to configure one or more matching shared-secret strings. The configured string must match the string used to create the DOCSIS configuration files downloaded to the CMs on that MAC domain, or the CMs will not be able to register.

Examples

The following example shows how to configure both a shared secret and a shared secondary secret:

```
admin@CableOS> config
admin@CableOS(config)# cable mac-domain 1:0/11.0 shared-secret 0 kirgj34g3kl4
admin@CableOS(config)# cable mac-domain 1:0/11.0 shared-secondary-secret index 1 0
 hf48hcoqwe2
admin@CableOS(config)# cable mac-domain 1:0/11.0 shared-secondary-secret index 2 0
 mk4nf43ionf4
admin@CableOS(config)# commit
admin@CableOS> show running-config cable mac-domain shared-secondary-secret
cable mac-domain 1:0/11.0
shared-secondary-secret index 1 7 +gpyUntmawUaivwJiLQ+jw==
shared-secondary-secret index 2 7 5oSrQtAZoYcPdk4MR7+ssw==
```

Related information

cable mac-domain * shared-secret

cable mac-domain * sid-range

Use the cable mac-domain * sid-range command to configure extended SID ranges.

`cable mac-domain` *mac-domain* `sid-range` *range*

Syntax description

mac-domain	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/ upstream RF port of the MAC domain • *d* identifies a MAC domain on the rf-port, which for the current release must be 0
range	The extended SID range. The valid values are 8k and 16k. The default value is 16k.

Default

See the Syntax section.

Command mode

Config mode.

Examples

This example shows the SID range being set to 8k:

```
cable mac-domain 1:0/0.0 sid-range 8k
```

Related information

show cable mac-domain sid-pools

cable mac-domain * us-bonding-group

In either cable mac-domain or cable template mac-domain configuration mode, enter the following command to enter a sub-configuration mode to a us-bonding-group for an individual mac-domain or for template global configuration of us-bonding-groups.

`us-bonding-group` *port-ubg-name*

The us-bonding-group sub-configuration mode displays the following prompt:

```
(mac-domain slot/mac-domain-id ubg ubg-name)#
```

To delete a down-channel, enter the following command in either cable ds-rf-port or cable template ds-rf-port configuration mode:

`no us-bonding-group` *port-ubg-name*

Syntax description

port-ubg-name	<string port-ubg-name: 1...3 characters> Mandatory Name that uniquely identifies the bonding group on each upstream RF port used by the MAC Domain. In CLI command output, a chassis-unique name of the UBG is formed with the expression **ulc-slot/ulc-port:port-ubg-name**. It is recommended to choose names that identify the direction and number of channels, for example, **U2A**, **U2B**, and so on, for upstream bonding groups of 2 channels. The name is limited to three characters for brevity in the `show` command output.
`admin-state`	<enum: enabled | disabled> Default disabled Administrative state of the UBG. The UBG admin-state must be **enabled** in order for the CableOS Core to use it. Setting the admin-state to **disabled** while modems are registered causes the CableOS Core to de-register all CMs with service flows assigned to the UBG.
[`snmp-index` *port-ubg-index*]	<integer port-ubg-index: 0...31> A component of the upstream channel set ID signaled in SNMP MIBs. During initial creation of a new us-bonding-group, the CableOS Core dynamically assigns an otherwise unused port-ubg-index to correspond to the new port-ubg-name for a us-rf-port. Each port-ubg-index corresponds to a unique port-ubg-name on a us-rf-port. The port-ubg-index is a hidden attribute of the CDB configuration database, and is replicated to the standby SRE. When an acquiring SRE takes over, it must use this attribute as the port-ubg-index.

`up-channel-set` *us-phy-logical-channel-set*	*us-phy-logical-channel-set* is a character string that identifies a list of **phy.logical us-logical-channels** in the upstream bonding group. All of the us-logical-channels must be on a us-phy-channel assigned to the MAC domain. This setting defines a configured upstream bonding group (UBG) for use by the CMs registered on the MAC domain. Example: `up-channel-set 0-2.0` When more than one us-rf-port is used by a MAC domain, the us-logical-channel assignment applies to each of the us-rf-ports used by the MAC domain. The CableOS Core CLI enforces that the configured us-logical-channels in a UBG are on the same 80G12 line card port. The CableOS Core maintains a minor alarm No Active Upstream Bonding Group Configured for a us-rf-port served by a MAC domain when Multiple Transmit Channel is enabled (with **mtc-mode enabled**) for the MAC domain, but no us-bonding-group is configured on that port, which contains at least one administratively **up** us-logical channel (meaning that is in an administratively **up** us-phy-channel).
`us-traffic-profile`	<string: qos-prof-name 1...15> Name of a us-traffic-profile. Assigns the us-traffic-profile that configures how traffic is admitted and scheduled among upstream QoS classes on the bonding group.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

See the descriptions in the Syntax description for usage guidelines.

Related information

cable mac-domain * us-bonding-group *ofdma-channel-set

cable mod-prof-ofdma

cable mac-domain * us-bonding-group *ofdma-channel-set

To add a list of OFDMA channels to an upstream bonding group, use the `cable mac-domain *us-bonding-group *ofdma-channel-set` command. To remove all OFDMA channels from an upstream bonding group, use the **no** version of the command.

`cable mac-domain` *md-name* `us-bonding-group` *port-ubg-name* `ofdma-channel-set` *ofdma-chan-index-set*
`no cable mac-domain us-bonding-group` *port-ubg-name* `ofdma-channel-set` *ofdma-chan-index-set*

Syntax description

md-name	A MAC domain name in the form **vc:vs/pp.d** where • **vc:vs** identifies an remote PHY device configured with cable rpd*vcvs* • **pp** identifies the single downstream RF port of the mac-domain, as configured with cable ds-rf-port *vc:vs/pp* • **d** identifies a MAC domain on the ds-rf-port, which for the current release must be 0. For more information, see the *Syntax description* section.
port-ubg-name	A short (4-letter) name identifying an upstream bonding group on each of the us-rf-ports reached by the MAC domain. These are the us-rf-ports configured in one or more "cable fiber-node" configurations as reached by the ds-rf-port of the MAC domain. All us-rf-ports reached by a MAC domain have the same set of us-bonding-groups.
ofdma-chan-index-set	A comma-separated list of ofdma-chan-index configured for OFDMA channels with the `cable us-rf-port vc:vs/qq ofdma-channel ofdma-chan-index` command. The CMTS validates that the ofdma-channel configuration must exist for all us-rf-ports *qq* reached by the MAC domain per the "**cable fiber-node**" configuration, although its admin-state may be up or down. WARNING: During commitment of a bonding group change, all channels added or removed are briefly disabled as for "admin-state down". This may force re-registration of some or all cable modems using the affected channel.

Default

There are no defaults for this command.

Command mode

Config mode.

Usage guidelines

Upstream bonding groups may have only OFDMA channels or have both single-carrier upstream logical channels and OFDMA channels.

To change an existing set of OFDMA channels in a us-bonding-group, it is necessary to delete and re-add the us-bonding-group:

1. Delete the existing set with `no cable mac-domain * us-bonding-group * ofdma-channel-set`.
2. Commit the deletion with commit.
3. Add the new set as desired with `cable mac-domain * us-bonding-group * ofdma-channel-set new-set`.
4. Commit the re-addition with commit.

Example

The following example shows the 1x2 Pebble RPD configured with its one ds-rf-port split into two "fiber-node" topology groups, each of which reaches a different us-rf-port.

```
cable rpd 1:0
  ...
cable us-rf-port 1:0/0
  ! us-phy-channel 0 to 3, each with us-logical-channel 0
  ofdma-channel 0
    ...
cable us-rf-port 1:0/1
  ! us-phy-channel 0 to 3, each with us-logical-channel 0
  ofdma-channel 0
    ...
cable fiber-node fn0
  ds-rf-port 1:0/0
  us-rf-port 1:0/0
cable fiber-node fn1
  ds-rf-port 1:0/0
  us-rf-port 1:0/1
cable mac-domain 1:0/0.0
  us-bonding-group U2A
    us-channel-set 0-3.0
    ofdma-channel-set 0
```

Related information

cable mac-domain * us-bonding-group

cable mod-prof-ofdma

cable mac-domain * us-dynamic-bonding-group

Use the `cable mac-domain * us-dynamic-bonding-group` command to enable and disable upstream dynamic bonding groups for a MAC domain.

`cable mac-domain` *md-name* `us-dynamic-bonding-group` [{ *disabled* | *enabled* }]

Syntax description

md-name	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/upstream RF port of the mac-domain • *d* identifies a MAC domain on the rf-port, whichconfig for the current release must be 0
disabled | *enabled*	Disables and enables the feature

Default

There are no default values for this command.

Command mode

Config mode.

Usage Guidelines

You can either work with static bonding groups or dynamic bonding groups. To work with dynamic bonding groups, you must first disable static bonding groups with the `cable mac-domain no us-bonding-group` command. After enabling the dynamic bonding groups, use the *cable mac-domain * controller dynamic-bg* command to configure bonding group sizes.

UBGs will be dynamically created based on the configuration parameters.

UBGs will be recalculated after the following triggers:

- The enable/disable of the dynamic UBGs feature
- The creation of a MAC domain with dynamic UBG enabled
- Changing channels in the MAC domain (number of them or their frequencies)
- The disable and re-enable of the feature should recalculate afresh the entire set of UBGs (but will drop all CMs on the MAC domain)

Example

```
cable mac-domain 1:0/0.0 us-dynamic-bonding-group disabled
```

Related information

cable template mac-domain

cable mac-domain * controller dynamic-bg

cable mac-domain * ds-dynamic-bonding-group
show dynamic-bonding-group

cable mac-domain * voice-assignment-performance-based

Use the `cable mac-domain * voice-assignment-performance-based` command to help choose the best chanel for voice calls based on free available bandwidth.

`cable mac-domain` *md-name* `voice-assignment-performance-based` `admin-state` `{` `up` `|` `|` `down` `}` `[` `snr-thresholds` *modulation* `snr-threshold` *threshold* `]`

Syntax description

md-name	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/ upstream RF port of the mac-domain • *d* identifies a MAC domain on the rf-port, whichconfig for the current release must be 0
`up`|`down`	The administrative state of the feature. Must be up to work with the feature.
`snr-thresholds` *modulation*	A list of score thresholds to be used to give "priority" to certain modulations.
`snr-threshold` *threshold*	The threshold to be used in calcualting the score, in units of dB

Default

This command has no default value.

Command mode

Exec mode

Usage guidelines

Without this feature, channels for voice calls are chosen based on how much free bandwidth is available on each channel (Admission Control). This feature will use the channel with the highest score (SNR, etc) for voice calls. The feature is enabled by setting the `admin-state` to up and configuring thresholds which are used to give priority to certain modulations.These thresholds are subtracted from the channel's score to give a new score. Score values (SNR, etc.) are stored before checking the bandwidth requirement, the system will try to use the channel with the highest score. If there are a few channels with the same score, the one which has the most free bandwidth will be chosen. If the channel with the highest score does not have enough bandwidth to admit the voice call, the system will try to use the next best channel (possibly with a lower score).

See the example below for

Examples

As stated in the Usage Guidelines, the configured thresholds are used to create new scores for each channel, which may result in a different channel being chosen for voice calls, as can be seen in this example:

Assume three channels with different modulations and scores:

- qam8, current score 40dB
- qam32, current score 35dB
- qam128, current score 30dB

If no thresholds are configured, then the qam8 channel will be chosen, as it has the highest score. However, if a higher modulation is required for voice calls, the following configuration could be used:

```
cable mac-domain 3:0/0.0
 voice-assignment-performance-based admin-state up
 voice-assignment-performance-based snr-thresholds qam8
  snr-threshold 30.0
 !
 voice-assignment-performance-based snr-thresholds qam32
  snr-threshold 20.0
 !
 voice-assignment-performance-based snr-thresholds qam128
  snr-threshold 10.0
 !
```

The scores will now look as follows:

- qam8, score: 40dB - 30dB = 10dB
- qam32, score: 35dB - 20dB = 15dB
- qam128, score: 30dB - 10dB = 20dB

The qam128 channel now has the highest score and will be the channel chosen for voice calls.

cable mcast

Use the `cable mcast` command to configure the multicast interface for the IPTV feature and the IP Direct feature.

`cable mcast` `admin-state` *admin-state* `cre-vlan-id` *cre-vlan-id* `mcast-ip-address` *mcast-ip-address* [`cm-max-sessions` *cm-max-sessions*] [`igmp-query-timeout-sec` *igmp-query-timeout-sec*] [`general-query-interval-sec` *general-query-interval-sec*] [`igmp-query-max-response-time-sec` *igmp-query-max-response-time-sec*] [`robustness-variable` *robustness-variable*] [`last-member-query-interval-sec` *last-member-query-interval-sec*] [`last-member-query-count` *last-member-query-count*] [`dbc-t10-timer` { `enabled` | `disabled` }] [`operating-mode` *operating-mode*]

Syntax description

admin-state	Configured administrative state of the multicast interface. Setting this attribute to **up** enables operation of all multicast functions. Setting this attribute to **down** configures the CableOS Core to not use the multicast functions but still permits configuration of its other attributes.
cre-vlan-id	The CRE VLAN ID for the multicast traffic. The valid range is 0-4094.
mcast-ip-address	The multicast interface IP and subnet. Only IPv4 addresses are supported.
cm-max-sessions	Optional The maximum number of simultaneous multicast sessions per Cable Modem. the valid range is 1 - 255 and the default value is 10.
igmp-query-timeout-sec	Optional The timeout in seconds after which multicast session will be deleted if no IGMP Join has arrived. The valid range is 1 - 65535 and the default value is 260.
general-query-interval-sec	Optional The interval in seconds between general queries sent by the Core. The valid range is 1 - 65535 and the default value is 125.
igmp-query-max-response-time-sec	Optional Specifies the maximum allowed time before sending a responding report. The valid range is 1 - 65535 and the default value is 10.

robustness-variable	Optional Allows tuning for the expected packet loss on a subnet, such as increasing the *igmp-query-timeout-sec* or the *last-member-query-count*. The valid range is 2-10 and the default value is 2. If *igmp-query-timeout-sec* is not configured, it is calculated using the formula: "*general-query-interval-sec* * *robustness-variable* + *igmp-query-max-response-time*" If *last-member-query-count* is not configured its value is set equal to the *robustness-variable*.
last-member-query-interval-sec	Optional The maximum response time in seconds inserted into Group-Specific Queries sent in response to Leave Group messages, and is also the amount of time between Group-Specific Query messages. The valid range is 1 - 65535 and the default value is 1.
last-member-query-count	Optional The number of Group-Specific Queries sent before the router assumes there are no local members. The valid range is 2-10 and the default value is 2.
`dbc-t10-timer`	`enabled|disabled` Optional A switch which defines if there should be a `kDynamicChangePostTransactionDelay` (5 seconds) delay after each DBC process for multicast. By default, this switch is disabled. **NOTE:** This parameter is used only when configuring the IP Direct feature.
operating-mode	Optional The operation mode switch. The valid options are *ip-direct* and *iptv*. iptv mode is required for mcast channel set configuration under MD. The default option is *iptv*.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines for the IPTV feature

- When configuring the CRE, you must ensure that the ID and the address are the same as used in this definition
- Minimize the number of replications within a single MD (keep it as single Replica for the entire MD)
- Define the channels in the Bonding Group dedicated for Multicast (aka Multicast Bonding Group - MBG)
- CMs that can get the Multicast Service must have capabilities of DS Bonding larger than the Multicast Bonding Group
- CMs that register to get the Multicast Service must have a Bonding Group that contains the MBG
- Provisioning attribute masks are used to distribute CMs between relevant BGs correctly

Usage guidelines for the IP Direct feature

- The IP Direct service is provided on each primary channel
- The `cable mac-domain mcast-channel-set` configuration is not required and is not used in IP Direct

Example

This example show the configuration for the IPTV feature

```
cable mcast admin-state up
cable mcast cre-vlan-id 2402
cable mcast mcast-ip-address 140.99.4.2/24
cable mcast cm-max-sessions 10
cable mcast igmp-query-timeout-sec 260
cable mcast general-query-interval-sec 125
cable mcast igmp-query-max-response-time-sec 10
cable mcast robustness-variable 2
cable mcast last-member-query-interval-sec 1
cable mcast last-member-query-count 2
```

This example shows the configuration for the IP Direct feature

```
cable mcast admin-state up
cable mcast cre-vlan-id 2402
cable mcast mcast-ip-address 140.99.4.2/24
cable mcast cm-max-sessions 10
cable mcast robustness-variable 2
cable mcast igmp-query-timeout-sec 75
cable mcast general-query-interval-sec 30
cable mcast igmp-query-max-response-time-sec 10
cable mcast last-member-query-interval-sec 1
cable mcast last-member-query-count 2
cable mcast dbc-t10-timer disabled
cable mcast operating-mode ip-direct
```

Related information

cable mac-domain * mcast-channel-set

show cable multicast

cable md-downstream-qos-profile

Use the `cable md-downstream-qos-profile` command to create a downstream QoS traffic MAC domain profile for both DEPI QoS and service flow queue settings.

`cable md-downstream-qos-profile` [*prof-name* | `default`] [`psp-flow` *id* `dscp` *dscp*] [`docsis-traffic-priority` *priority* `psp-flow` *id*] [`class-cir` { `DsReserved` | `DsVoice` | `DsVoiceEm` } `queue-limit-msec` *queue-limit* `assumed-packet-size-bytes` *packet-size*] [`class-eir` `DsBestEffort` `queue-limit-msec` *queue-limit* `assumed-packet-size-bytes` *packet-size*]

Syntax description

prof-name	String - the name of the traffic profile. `default` is the default profile name.
priority	Integer 0..7 - DOCSIS traffic priority. This mapping between the DOCSIS traffic priority and the PSP flow takes effect for all static service flows (not dynamically created). Dynamically created service flows and DOCSIS management traffic are hard coded to use PSP flow 3.
id	Integer 0..3 - PSP flow id within the DEPI session.
dscp	Integer 0..63 - DSCP mark
`DsReserved`	QoS Class for downstream minimum-reserved-rate traffic.
`DsVoice`	QoS class for downstream voice traffic.
`DsVoiceEm`	QoS class for downstream voice emergency traffic.
`DsBestEffort`	QoS class for best effort traffic.
queue-limit	Real with 1 fractional digit, 0.1.. 200.0 - Defines service flow queue size in milliseconds. The queue size will be sufficient to buffer the traffic for *queue-limit* milliseconds at a maximum sustained rate for this service flow, given that the packet size is not smaller than assumed *packet-size* bytes. Default is 50 Ms.
packet-size	Integer 64..2000 - used to define the service flow queue size, along with the *queue-limit* msec. This value is also used also for admission control calculations.

Default

The Default profile can be edited and applies to all MDs that have no explicitly configured profile. See the Examples section for more information.

Command mode

Config mode.

Usage Guidelines

This profile allows the operator to map service flows based on their DOCSIS traffic priority into 3 of the 4 PSP flows, where PSP flow 3 is the highest priority and PSP flow 0 is the lowest priority, with corresponding configurable DSCP values.

Typically, best effort traffic should be assigned to PSP flow 0, and higher priority services should be assigned to higher priority PSP flows.

Note that PSP flow 3 is reserved for DOCSIS messages (including map messages) and for voice.

The md-downstream-qos-profile allows the user to control QoS parameters such as queue-limit and packet-size per QoS class.

Typically, no changes to QoS parameters are required by the operator.

Examples

If a mac-domain does not reference any **md-downstream-qos-profile**, and if an **md-downstream-qos-profile** with name *default* exists,then the mac-domain will use the *default* profile.

If a mac-domain does not reference any **md-downstream-qos-profile**, and no **md-downstream-qos-profile** *default* exists, then the following factory default values will be used:

```
psp-flow 0 dscp 0
psp-flow 1 dscp 0
psp-flow 2 dscp 0
psp-flow 3 dscp 46
docsis-traffic-priority 0-7 psp-flow 0
class-cir DsReserved queue-limit 50.0 assumed-packet-size-bytes 1518
class-cir DsVoice queue-limit 50.0 assumed-packet-size-bytes 128
class-cir DsVoiceEm queue-limit 50.0 assumed-packet-size-bytes 128
class-eir DsBestEffort queue-limit 50.0 assumed-packet-size-bytes 1518
!
```

When a mac-domain references an incomplete **md-downstream-qos-profile** (that is, some settings are not specified), then the missing settings will be taken from the *default* profile (given it exists). If the *default* profile does not exist, or if the missing settings are not specified in the *default* profile either, then the above factory defaults will be used.

The `md-downstream-qos-profile` *default* is created automatically on OSSU (but not on ISSU).

After it has been created, The `md-downstream-qos-profile` *default* cannot be deleted.

Newly created profiles are populated with the factory-default values shown above.

Related information

cable md-upstream-qos-profile

cable rpd sfp port

cable md-upstream-qos-profile

Use the cable md-upstream-qos-profile to create an upstream QoS traffic MAC domain profile.

`cable md-upstream-qos-profile` *prof-name* [`psp-flow` *id* `dscp` *dscp*] [`docsis-traffic-priority` *priority* `psp-flow` *id*]

Syntax description

prof-name	The name of the traffic profile
dscp	0..63 - DSCP mark
priority	0..7 - priority

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

There are no Usage Guidelines for this command.

Examples

Newly created profiles will have the following default values:

```
cable md-upstream-qos-profile new-profile
 psp-flow 0 dscp 0
 psp-flow 1 dscp 0
 psp-flow 2 dscp 0
 psp-flow 3 dscp 46
 docsis-traffic-priority 0-7 psp-flow 0
```

Related information

cable md-downstream-qos-profile

cable rpd sfp port

cable modem deny

Use the `cable modem deny` command to prevent specific cable modems from obtaining IP addresses from the CMTS.

`cable modem deny` { *single-cm* }

Syntax description

`single-cm`	Selects a CM.

Command mode

Config mode.

Usage guidelines

Although this command blocks DHCP traffic from the CM, it does not block CMs from registering with the CMTS. To do this, use the `cable privacy hotlist` command.

Examples

The following command would prevent the CM at MAC Address f0f2.4993.7e58 from being allocated an IP address:

```
cable modem deny f0f2.4993.7e58
```

Related information

cable privacy hotlist

cable modem remote-query

Use the `cable modem remote-query` command to enable the system to retrieve data from modems through an SNMP query. To disable the remote query option, use the **no** form of this command.

`cable modem remote-query` *polling-interval community-string*
`no cable modem remote-query`

Syntax description

polling-interval	Configures the interval in seconds that the remote query task waits after completing one full poll cycle of all CMs before starting the next poll cycle. The valid range is 1 .. 86400 seconds, with a recommended value of 300 seconds.
community-string	A text string the CableOS Core Remote Query task uses to read the CM's RF parameters. **NOTE:** The following special characters **only** can be used in the *community-string*: @ # $ % ^ & * ( ) + _ ”

Default

By default, Remote Query is not enabled.

Command mode

Config mode.

Usage guidelines

Remote query data is polled from all modems that have a matching *community-string* in their configuration. This polling is repeated continuously with a frequency of not more often than *polling-interval* seconds for each modem. The poll cycle will start immediately after Remote Query is enabled.

Examples

The following command enables Remote Query for all modems with a community string of public and defines a polling interval of 10 minutes (600 seconds):

```
cable modem remote-query 600 public
```

Related information

show cable modem remote-query

show cable remote-query cm

cable mod-prof-ofdma

Use the `cable mod-prof-ofdma` command to configure an OFDMA channel modulation profile. To delete an OFDMA channel modulation profile, enter the **no** form of this command.

`cable mod-prof-ofdma` *mod-prof-ofdma-index* `subcarrier-spacing` *subcarrier-spacing* `cyclic-prefix-samples` *cyclic-prefix* `rolloff-period-samples` *rolloff-period* `rx-windows-samples` *rx-window* `symbols-per-frame` *symbols-per-frame* `initial-ranging subcarriers` *initial-ranging-subcarriers* [`guard-subcarriers` *init-guard-subcarriers*] [`preamble-multiplier` *init-preamble-multiplier*] `fine-ranging subcarriers` *fine-ranging-subcarriers* [`guard-subcarriers` *fine-guard-subcarriers*] { `data-iuc` *ofdma-iuc* `modulation` *ofdma-mod-type* `pilot-pattern` *pilot-pattern* }

Syntax description

mod-prof-ofdma-index	Identifies an OFDMA channel modulation profile. Must be in the range 401 - 499. The OFDMA modulation profile index range is chosen so as not to overlap with the modulation profile indexes of pre-DOCSIS 3.1 upstream channels.
subcarrier-spacing	Selects the width of each OFDMA sub-carrier. Must be either: • "25 kHz" to select 4K FFT operation • "50 kHz" to select 2K FFT operation This is the nominal rate of OFDMA symbol transition; the actual rate is reduced because each symbol includes the configured Cyclic Prefix.

cyclic-prefix	Selects a number of samples at 102.4 Msamples/sec between each OFDMA symbol to diminish the impact of inter-symbol interference caused by micro-reflections. The valid values are: • 96 • 128 • 160 • 192 • 224 • 256 • 288 • 320 • 384 • 512 • 640 Increasing the cyclic-prefix-samples relative to the sum of rolloff-period-samples and rx-window-samples provides better protection against inter-symbol interference but reduces effective data throughput. The default value is 192.

rolloff-period	Selects the number of samples at 102.4 Msamples/sec that transmitters ramp up or ramp down during the Cyclic Prefix interval. The valid values are: • 0 • 32 • 64 • 96 • 128 • 160 • 192 • 224 The value must also be less than the cyclic-prefix value. This parameter applies to all IUC transmissions except for IUC 3 (Initial Ranging). The roll-off period size for Initial Ranging is based on the Cyclic Prefix size and is specified in DOCSIS PHY 3.1. Reducing the sum of rx-window-samples and rolloff-period-samples relative to the cyclic-prefix-samples provides better protection against inter-symbol interference. The default value is 64. Choosing a rolloff period of 0 gives an automatic number of rx-window samples based on cyclic-prefix. If cyclic-prefix<256 then the rx-window is set to 64, otherwise the rx-window is set to 192.

rx-window	Selects the number of samples at 102.4 Msamples/sec that the R-PHY receiver ramps up or ramps down during the Cyclic Prefix interval. The valid values are: • 0 • 4 • 8 • 16 • 32 • 64 • 96 • 160 • 192 • 224 • 256 The RxWindow protects the OFDMA channel from adjacent channels and interference signals. Larger rx-window-samples periods increase the adjacent signals interference protection of the OFDMA receiver. Reducing the sum of rx-window-samples and rolloff-period-samples relative to the cyclic-prefix-samples provides better protection against inter-symbol interference. The default value is 128.

<table>
<tr>
<td><em>symbols-per-frame</em></td>
<td>
<p>Specifies the number of OFDMA symbols per OFDMA frame.</p>
<p>When the modulation profile is not referenced by a configured OFDMA channel, the CMTS enforces only the absolute minimum and maximum values in the range 6 - 36.</p>
<p>When the modulation profile is referenced with cable us-rf-port * ofdma-channel * modulation-profile, however, the CMTS enforces DOCSIS PHY 3.1 requirements for symbols-per-frame based on the sub-carrier-spacing of the modulation profile and the width of the OFDMA channel:</p>
<table>
<tr><th>mod-prof-odfma subcarrier spacing</th><th>ofdm-channel width</th><th>symbols-per-frame range</th></tr>
<tr><td>25 khz</td><td>< 72 MHz</td><td>6 - 9</td></tr>
<tr><td></td><td>48 - 72 MHz</td><td>6 - 12</td></tr>
<tr><td></td><td>< 48 MHz</td><td>6 - 18</td></tr>
<tr><td>50 khz</td><td>< 72 MHz</td><td>6 - 18</td></tr>
<tr><td></td><td>48 - 72 MHz</td><td>6 - 24</td></tr>
<tr><td></td><td>< 48 MHz</td><td>6 - 36</td></tr>
</table>
<p>The CMTS enforces the above constraints on a commit that changes any of the following configurations:</p>
<ul>
<li>cable mod-prof-ofdma * symbols-per-frame</li>
<li>cable mod-prof-ofdma * subcarrier-spacing</li>
<li>cable us-rf-port * ofdma-channel * frequency-range-mhz
<p>An OFDMA minislot is 8 frames for 50 kHz operation and 16 frames for 25 kHz operation.</p></li>
</ul>
</td>
</tr>
</table>

initial-ranging-subcarriers	Specifies the number of sub-carriers for initial ranging in an OFDMA frame, not counting sub-carriers for a guard band. • For 25 kHz sub-carriers, the range must be 12 - 128 • For 50 kHz sub-carriers, the range must be 12 - 64 When an OFDMA channel is assigned to a modulation profile, the CMTS validates that the combination of the channel configuration and initial-ranging-sub-carriers permits allocation of an initial ranging interval conforming to DOCSIS PHY 3.1 requirement of less than 128 consecutive sub-carriers from the lowest to the highest sub-carrier including excluded and unused sub-carriers.
init-guard-subcarriers	Optionally specifies the minimum number of sub-carriers the CMTS leaves unscheduled as a guard band with half before and half after an interval of initial-ranging-sub-carriers. Range is 0 to 127 for 50 MHz and 0 to 255 for 25 MHz carrier-spacing. The default value if not specified is 16 sub-carriers for 50 MHz and 32 for 25 MHz, equivalent to one full minislot of guard band at the lower and upper edges. If necessary, the CMTS increases the number of operational guard band sub-carriers to schedule an integral number of minislots for the initial ranging interval.
init-preamble-multiplier	Optionally selects the multiplier of init-ranging-sub-carriers for the number of symbols in the initial ranging preamble (before duplication). Must be one of the following: 1 to 8 If omitted, the default init-preamble-multiplier is 4.
fine-ranging-subcarriers	Specifies the minimum number of sub-carriers for initial ranging in an OFDMA frame, not counting sub-carriers for a guard band. • For 25 kHz sub-carriers, the range must be 64 - 512 • For 50 kHz sub-carriers, the range must be 32 - 256 The CMTS may increase the scheduled number of fine-ranging-sub-carriers to meet PHY 3.1 requirements.

fine-guard-subcarriers	Optionally specifies the minimum number of sub-carriers to use as a guard band that is scheduled half before and half after an interval of *fine-ranging-subcarriers*. Range is 0 to 127 for 50 MHz and 0 to 255 for 25 MHz carrier-spacing. The default value if not specified is 2 sub-carriers (for either 25 kHz or 50 kHz sub-carriers). The CMTS may increase the scheduled number of guard band sub-carriers to schedule an integral number of minislots for a fine ranging interval.
ofdma-iuc	Configures a list of minislot modulations for interval usage code *iuc*. The ofdma-iuc value must be one of the following: • 5 • 6 • 9 • 10 • 11 • 12 • 13 Before accepting a commit, the CMTS validates that IUC 13 is always configured. IUC 13 is used for pre-registration traffic, and should be robust.
ofdma-mod-type	Specifies the default OFDMA modulation for all active data sub-carriers of the OFDMA channel. No sub-ranges of the same data-iuc list can overlap. The *ofdma-mod-type* must be one of the following values: • BPSK • QPSK • 8-QAM • 32-QAM • 64-QAM • 128-QAM • 1024-QAM • 2048-QAM • 4096-QAM
pilot-pattern	The *pilot-pattern* selects a pilot pattern from the DOCSIS PHY 3.1 specification, and has different ranges depending on the sub-carrier spacing: • 50 kHz sub-carrier-spacing: 1 - 7 • 25 kHz sub-carrier-spacing: 8 - 14

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

Upstream OFDMA channel operation requires the configuration of at least one OFDMA modulation profile with this command. An upstream OFDMA channel references a modulation with the cable us-rf-port ofdma-channel modulation-profile `mod-prof-ofdma-index` command.

The Harmonic CMTS uses the maximum permitted length for the initial ranging and fine ranging preamble, so these values are not configured.

Example

```
cable mod-prof-ofdma 401
 subcarrier-spacing     25khz
 cyclic-prefix-samples  192
 rolloff-period-samples 64
 rx-windows samples     128
 symbols-per-frame      16
 initial-ranging guard-subcarriers 128 subcarriers 128 preamble-multiplier 4
 fine-ranging guard-subcarriers 128 subcarriers 128
 data-iuc 10
  modulation    qam1024
  pilot-pattern 4
 data-iuc 11
  modulation    qam256
  pilot-pattern 4
 data-iuc 12
  modulation    qam128
  pilot-pattern 3
 data-iuc 13
  modulation    qam64
  pilot-pattern 3
```

Related information

cable mac-domain * us-bonding-group

cable mac-domain * us-bonding-group *ofdma-channel-set

show cable mod-prof-ofdma

show cable us-rf-port ofdma-channel

cable modulation-profile

Use the `cable modulation-profile` command to configure a new or existing interval in a modulation profile.

`cable modulation-profile` *mod-prof-index us-channel-type iuc burst-params*

To delete a single interval of an operator-defined modulation-profile or restore a single interval of a factory-defined modulation-profile to factory default values, commit the following:

`no cable modulation-profile` *mod-prof-index iuc*

To delete all intervals of an operator-defined modulation-profile or restore all intervals of a factory-defined modulation-profile to factory default values, commit the following:

`no cable modulation-profile` *mod-prof-index*

Syntax description

The IUC burst-params must be entered in exactly the order shown in this table.

mod-prof-index	<integer: 1..400> Mandatory Identifies the modulation-profile on the COS CORE.
us-channel-type	<enum: tdma | atdma | tdma-atdma > Mandatory A us-logical-channel template that references a modulation-profile must have a matching *us-channel-type.*

<table>
<tr>
<td><i>iuc</i></td>
<td>
<p><enum: request | reqdata | initial | station | short | long, a-short | a-long | a-ugs> Mandatory</p>
<p>The Interval Usage Code name should be set according to this table:</p>
<table>
<tr><th>IUC Name</th><th>IUC Value</th><th>IUC Description</th></tr>
<tr><td>request</td><td>1</td><td>Bandwidth Request</td></tr>
<tr><td>reqdata</td><td>2</td><td>Request/Data</td></tr>
<tr><td>initial</td><td>3</td><td>Initial Maintenance</td></tr>
<tr><td>station</td><td>4</td><td>Station Maintenance</td></tr>
<tr><td>short</td><td>5</td><td>Short Grant</td></tr>
<tr><td>long</td><td>6</td><td>Long Grant</td></tr>
<tr><td>a-short</td><td>9</td><td>Advanced Phy Short Grant</td></tr>
<tr><td>a-long</td><td>10</td><td>Advanced Phy Long Grant</td></tr>
<tr><td>a-ugs</td><td>11</td><td>Advanced Unsolicited Grant Service</td></tr>
</table>
<p>The <i>iuc</i> value is configured and displayed as the enumerated name; the numeric value of the IUC is encoded in a DOCSIS MAP packet.</p>
<p>The reqdata “Request/Data” IUC code 2 may be configured but is never scheduled by the COS CORE.</p>
</td>
</tr>
<tr>
<td><i>fec-error-correction</i></td>
<td>
<p><integer <i>T</i>: 0..16> Mandatory</p>
<p>Specifies the number of correctable error bytes (t) used in forward error correction. The value of 0 indicates that no correction is employed. The number of check bytes appended will be twice this value.</p>
</td>
</tr>
<tr>
<td><i>fec-codeword-length</i></td>
<td>
<p><integer <i>K</i>: 1..255> Mandatory</p>
<p>The number of data bytes (k) in the forward error correction codeword. This object is not used if fec-error-correction is zero.</p>
</td>
</tr>
</table>

max-burst-mslots	<integer: 0..255> Mandatory The maximum number of mini-slots that can be transmitted in the interval. A value of 0 means unlimited.
guard-time	<integer: 8..255> Mandatory The number of modulation symbols from the end of the last symbol of one burst to the start of modulation of the first symbol of the preamble in the next burst. Harmonic recommends a value of 48 symbols for the initial and station intervals, and a value of 8 symbols for all other intervals.
modulation	<enum qpsk | qam8 | qam16 | qam32 | qam64 | qam128 > Mandatory Specifies the modulation in this interval.
scrambler	<enum: scrambler | no-scrambler> Mandatory Indicates whether the scrambler is employed.
scrambler-seed	<integer: 0..32767> Mandatory The 15-bit seed value for the scrambler polynomial.
differential-encoding	<enum: diff | no-diff> Mandatory Specifies whether or not differential encoding is used.
preamble-length	<integer *bits*: 0..1536> Mandatory Preamble length in bits.
last-codeword-shortened	<enum: fixed | shortened> Mandatory Indicates whether the last FEC codeword is truncated.
preamble	<enum qpsk0 | qpsk1 > Mandatory for IUCs “a-short”, “a-long”, and “a-ugs”, and for all IUCs with us-channel-type “atdma”. Preamble type for DOCSIS 2.0 bursts.
byte-interleaver-depth	<integer 0,1,2..255> Mandatory for IUCs “a-short”, “a-long”, and “a-ugs” and for all IUCs with us-channel-type “atdma”. Reed-Solomon block interleaving depth. A depth of 0 indicates Dynamic Mode; a depth of 1 indicates RS Interleaving Disabled (see DOCSIS PHY); otherwise depth is floor [2048/(K+2T)].

byte-interleaver-block-size	<integer: 0..2048> Mandatory for IUCs “a-short”, “a-long”, and “a-ugs” and for all IUCs with us-channel-type “atdma”. Reed-Solomon block interleaving size in Dynamic Mode (2*Nr through 2048 where Nr=k+2T).

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

A cable modulation-profile consists of a set of interval configurations. Each interval configuration is identified by an interval usage code *iuc* and contains a set of burst parameters (*burst-params)* for that particular *iuc*.

Every us-logical-channel references one modulation profile with a “modulation-profile *mod-prof-index”* configuration in us-logical-channel configuration mode. That reference itself is usually auto-configured from the “template *us-logical-template*” reference to a “cable us-logical-channel template”. The *us-channel-type* of the us-logical-channel configuration must match the *us-channel-type* of the modulation-profile referenced by it.

The COS CORE supports up to 400 modulation profiles with *mod-prof-index* in the range 1..400. There is no restriction on the values of *mod-prof-index* for any particular us-channel-type.

The COS CORE implements several factory-defined modulation-profiles that may be modified but not deleted. The command `no cable modulation-profile` *mod-prof-index* for a factory-defined *mod-prof-index* restores it to factory default configuration rather than deleting it.

The particular set of interval IUCs required in a modulation-profile depends on its *us-channel-type*. Harmonic uses the term *us-channel-type* as described in the CCAP data model. The following table shows which IUCs must be defined for each *us-channel-type*:

us-channel type	Required IUCs
tdma	request(1), initial(3), station(4), short(5), long(6)
atdma	Request(1), initial(3), station(4), a-short(9), a-long(10), a-ugs(11)
tdma-atdma	Request(1), initial(3), station(4), short(5), long(6), a-short(9), a-long(10), a-ugs(11)

All IUCs listed as required for a us-channel-type must be defined before the COS CORE accepts commitment of a set of “cable modulation-profile” lines for the modulation-profile. The COS CORE rejects configuration for a combination of us-channel-type and IUC that is not shown in the above table.

SCDMA is not supported in the current release.

The COS CORE does not permit a us-logical-channel configuration to reference a modulation-profile unless all intervals of the modulation-profile match the us-channel-type of the us-logical-channel, all required IUCs are configured, and all required burst-params of those IUCs are configured.

A Type 4 Burst Descriptor must configure all *burst-params* in the order shown in the table below from *fec-error-correction* to *differential-encoding*, and may omit configuration for all other *burst-params*. For example:

```
# cable modulation-profile 26 tdma request 0 16 0 8 qpsk scrambler 152 no-diff 68
 fixed
```

A us-logical-channel with us-channel-type “tdma” uses only the first 10 attributes; the last 4 attributes, if specified, are ignored.

An “ATDMA Type 5” Burst Descriptor must additionally configure *preamble*, *byte-interleaver-depth,* and *byte-interleaver-block-size.* For example:

```
# cable modulation-profile 227 atdma-tdma request 0 16 0 8 qpsk scrambler 152 no-
diff 68 fixed qpsk0 1 2048
```

A us-logical-channel with us-channel-type “atdma” or “tdma-atdma” must reference a modulation-profile with all 14 attributes specified.

Due to the large number of *burst-params* in a modulation-profile interval configuration, all *burst-param* values are entered as a space-separated sequence of values on the same configuration line.

The Harmonic input format for modulation-profiles is identical to the Cisco modulation profile configuration, but only for the relatively new “global-scheme” format. Many customers may have a configuration that is pre-“global-scheme”. In this case, the only editing required of the pre-“global-scheme” format is to add the us-channel-type parameter after the mod-prof-index.

There is no configuration mode for “cable modulation-profile”; an interval configuration for an *iuc* with all its *burst-params* must be entered on a single configuration line starting with “cable modulation profile”. When entering the *burst-param* values, type ‘?’ to observe the name of the next attribute.

The order of attributes shown and the enumerated value keywords are based on CMTS industry practice. The formal attribute names (which are shown only for “show running-config” are from the Cablelabs CCAP YANG schema.

To remove an incorrectly entered interval while preparing a CLI transaction, enter “no cable modulation-profile *mod-prof-index iuc”* before committing the transaction.

For compatibility with industry CMTS practice, the COS CORE implements a CLI command “show cable modulation-profile” that displays the most important *burst-params* of modulation profiles in a compact tabular format. Use this command rather than “show running-config” to display the cable modulation-profile configuration.

Example

The following example shows a typical configuration:

```
cable modulation-profile 122 atdma request 0 16 0 22 qpsk scrambler 152 no-diff 32
 fixed
cable modulation-profile 122 atdma initial 5 34 0 48 qpsk scrambler 152 no-diff 100
 fixed
cable modulation-profile 122 atdma station 5 34 0 48 qpsk scrambler 152 no-diff 100
 fixed
```

```
cable modulation-profile 122 atdma short 4 76 7 22 16qam scrambler 152 no-diff 128
 shortened
cable modulation-profile 122 atdma long 9 232 0 22 16qam scrambler 152 no-diff 128
 shortened
cable modulation-profile 122 atdma a-short 4 76 7 22 16qam scrambler 152 no-diff 64
 shortened qpsk1 1 2048
cable modulation-profile 122 atdma a-long 9 232 0 22 16qam scrambler 152 no-diff 64
 shortened qpsk1 1 2048
cable modulation-profile 122 atdma a-ugs 9 232 0 22 16qam scrambler 152 no-diff 64
 shortened qpsk1 1 2048
```

cable nit-replace

Use the `cable nit-replace` command to define Network Interface Table profiles that can then be assigned to RPDs.

`cable nit-replace` *profile* `mc-dst-ip` *dst-ip* [`src-ip` *src-ip*] `l2tp-session-id` *l2tp-id*

To remove a profile, use the **no** version of the command:

`no cable nit-replace` *profile*

Syntax description

profile	A unique ID for the profile. You can create up to 256 profiles, with IDs from 0 - 255.
`mc-dst-ip` *dst-ip*	The IP address of the destination multicast set. Both IPv4 and IPv6 addresses are valid. You must enter this parameter.
`src-ip` *src-ip*	The IP address of the NIT core source. Both IPv4 and IPv6 addresses are valid.
`l2tp-session-id` *l2tp-id*	The L2TP session ID. You must enter this parameter.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

Every nit-replace profile must be unique (configuring 2 nit-replace profiles with the same 3 parameters will fail).

The nit-replace profile parameters must not overlap with any service-group or oob-core (configuring a nit-replace profile with the same l2tp-session-id and mc-dst-ip will fail)

You cannot delete a profile that has been assigned to an RPD.

Examples

The example below shows the definition of profile number **18** for multicast destination address **224.0.0.251**, source address **196.178.18.1**, and L2TP ID **5**

```
cable nit-replace 18 mc-dst-ip 224.0.0.251 src-ip 196.178.18.1 l2tp-session-id 5
```

Related information

cable rpd nit-replace

cable mtu-enhance

Use the `cable mtu-enhance` command to configure how the Core will set the Maximum Transmission Unit (MTU).

`cable mtu-enhance` [`disabled` | `enabled`] [`size` *size*]

Syntax description

`enabled | disabled`	Enabled - DOCSIS 3.1 modems MTU is 2000 and all others are 1900. Disabled - DOCSIS 3.1 modems will have the same settings as all other modems.
size	MTU size. Range is 1518 to 2000. The default is 1900.

Default

The default value for the command is enabled, and the default size is 1900.

Command mode

Config mode.

Usage guidelines

Any change of size will be applied only after a CM is re-registered. If the feature is enabled, size must be less than **system mtu** minus 126. The CLI will validate this.

Example

The following example enables enhanced MTU at a size of 1950.

```
cable mtu-enhance enabled size 1950
```

Related information

show running-config cable mtu-enhance
system mtu
show cable modem mtu

cable ofdm-guard-band

Use the `cable ofdm-guard-band` command to define the unused frequency width in MHz of the guard band below the lowest active subcarrier, or above the highest active subcarrier, in the OFDM channel. To remove the configuration, use the **no** form of this command.

`cable ofdm-guard-band` *<guard-band-index> width-mhz <decimal number> [description <string>]*
`no cable ofdm-guard-band` *<guard-band-index>*

Syntax description

guard-band-index	unsignedByte larger or equal to 1.
width-mhz	Decimal number larger or equal to 1.0 MHz.
description	(Optional) Descriptive text string.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

The parameter is referred to from each of the configured OFDM channels using the lower-guard-band-index and upper-guard-band-index.

The nominal value used to provide sufficient adjacent channel protection to and from neighboring channels is 1.0 MHz. A larger value provides increased adjacent channel protection. To provide better interference protection from the OFDM channel to neighboring channels (either QAM or OFDM), use a combination of a larger cyclic-prefix (`cable ds-rf-port vc:vs/pp ofdm-channel C cyclic-prefix`) for the OFDM channel and `ofdm-guard-band width-mhz` for the OFDM channel.

Example

In this example, the lowest frequency active subcarrier of ofdm-channel 0 on downstream port 17:0/1 will be located at 901.0 MHz:

```
cable ofdm-guard-band 2 width-mhz 1.0 description "used for lower guard”
```

Then within an OFDM channel configuration:

```
cable ds-rf-port 17:0/1 ofdm-channel 0 lower-bdry-freq-mhz 900.0 lower-guard-
band-index 2
```

cable oob-core

Use the `cable oob-core` command to configure the Out-of-Band Core destination sub-menu.

`cable oob-core` *core-id*

Syntax description

core-id	The ID of the downstream core OOB. The valid range is 0-255.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

IMPORTANT: If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines the downstream core OOB ID as 0.

```
cable oob-core 0
```

Related information

cable ds-rf-port oob-channel

cable ds-rf-port oob-channel frequency-mhz

cable ds-rf-port oob-channel oob-core-id

cable ds-rf-port oob-channel type

cable oob-core l2tp-session-id

cable oob-core mc-dst-ip

cable oob-core src-ip

cable oob-core l2tp-session-id

Use the `cable oob-core l2tp-session-id` command to configure the L2TP session ID between the Out-of-Band Core and the Harmonic Pebble/ RPD.

`cable oob-core` *core-id* `l2tp-session-id` *sessionid*

Syntax description

core-id	The ID of the downstream core OOB. The valid range is 0-255.
sessionid	L2TP session ID between the Out-of-Band Core and the Harmonic Pebble in decimal format.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

⚠ **IMPORTANT:** If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines the L2TP session ID 10001 for the downstream core OOB whose ID is 0.

```
cable oob-core 0 l2tp-session-id 10001
```

Related information

cable ds-rf-port oob-channel
cable ds-rf-port oob-channel frequency-mhz
cable ds-rf-port oob-channel oob-core-id
cable ds-rf-port oob-channel type
cable oob-core
cable oob-core mc-dst-ip
cable oob-core src-ip

cable oob-core mc-dst-ip

Use the `cable oob-core mc-dst-ip` command to configure the Out-of-Band Core IP address.

`cable oob-core` *core-id* `mc-dst-ip` *ip*

Syntax description

core-id	The ID of the downstream core OOB. The valid range is 0-255.
ip	The IP multicast address (either IPv4 or IPv6) from the Out-of-Band Core. If the service is unicast or not required, use an address of 0.0.0.0 for IPv4 or :: for IPv6.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

⚠ **IMPORTANT:** If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines the Out-of-Band Core multicast IPv4 address 224.0.1.150 for the downstream core OOB whose ID is 0.

```
cable oob-core 0 mc-dst-ip 224.0.1.150
```

The following example defines the Out-of-Band Core multicast IPv6 address ff30::220:a3ff:fe26:805c for the downstream core OOB whose ID is 1.

```
cable oob-core 1 mc-dst-ip ff30::220:a3ff:fe26:805c
```

Related information

cable ds-rf-port oob-channel
cable ds-rf-port oob-channel frequency-mhz
cable ds-rf-port oob-channel oob-core-id
cable ds-rf-port oob-channel type
cable oob-core
cable proto-throttle
cable oob-core src-ip

cable oob-core src-ip

Use the `cable oob-core src-ip` command to configure the Out-of-Band Core source address.

`cable oob-core` *core-id* `src-ip` *ip*

Syntax description

core-id	The ID of the downstream core OOB. The valid range is 0-255.
ip	IP source address (either IPv4 or IPv6) from the Out-of-Band Core.If the service is unicast or not required, use an address of 0.0.0.0 for IPv4 or :: for IPv6.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

IMPORTANT: If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines the Out-of-Band Core source IP address 224.0.1.150 for the downstream core OOB whose ID is 0.

```
cable oob-core 0 src-ip 224.0.1.150
```

Related information

cable ds-rf-port oob-channel
cable ds-rf-port oob-channel frequency-mhz
cable ds-rf-port oob-channel oob-core-id
cable ds-rf-port oob-channel type
cable oob-core
cable proto-throttle
cable oob-core mc-dst-ip

cable oob-dest id

Use the `cable oob-dest-id` command to relate the Out-of-Band Core destination configuration to the initial OOB US channel configuration.

`cable oob-dest id` *id*

Syntax description

id	The ID of the upstream destination. The valid range is 0-255.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

! **IMPORTANT:** If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example relates the destination configuration to upstream channel 9.

```
cable oob-dest id 9
```

Related information

cable oob-dest l2tp

cable oob-dest us-vc
cable us-rf-port oob-channel
cable us-rf-port us-oob-channel dest-id
cable us-rf-port us-oob-channel frequency-mhz
cable us-rf-port us-oob-channel type

cable oob-dest l2tp

Use the `cable oob-dest l2tp` command to configure the L2TP session ID between the Harmonic Pebble/ RPD and the Video Core.

`cable oob-dest id` *id* `l2tp-session-id` *session id*

Syntax description

id	The ID of the upstream destination. The valid range is 0-255.
session id	The L2TP session ID between the Video Core and the Harmonic Pebble (Remote Phy Device)

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

IMPORTANT: If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example associates L2TP session 121 with upstream channel 9.

```
cable oob-dest id 9 l2tp 121
```

Related information

cable oob-dest id
cable oob-dest us-vc
cable us-rf-port oob-channel
cable us-rf-port us-oob-channel dest-id
cable us-rf-port us-oob-channel frequency-mhz
cable us-rf-port us-oob-channel type

cable oob-dest us-vc

Use the `cable oob-dest-id` command to configure the Out-of-Band Core unicast IP address.

```
cable oob-dest id id us-vc ip
```

Syntax description

id	The ID of the upstream destination. The valid range is 0-255.
ip	The IP address (either IPv4 or IPv6).

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

⚠ **IMPORTANT:** If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example associates the Out-of-Band Core address 101.178.21.255 with upstream channel 9.

```
cable oob-dest id 9 us-vc 101.178.21.255
```

Related information

cable oob-dest id

cable oob-dest l2tp

cable us-rf-port oob-channel

cable us-rf-port us-oob-channel dest-id

cable us-rf-port us-oob-channel frequency-mhz

cable us-rf-port us-oob-channel type

cable privacy accept-self-signed-certificate

Use the `cable privacy accept-self-signed-certificate` command to enable cable modems to register using self-signed cm/manufacturer certificates. To remove the self-signed certificates, use the **no** form of the command.

```
cable privacy accept-self-signed-certificate [{cm | manufacturer}]{enable |
disable}
no cable privacy accept-self-signed-certificate [{cm  | manufacturer}]
```

Command mode

Config mode.

Usage guidelines

The command enables cable modems to register using self-signed cm/manufacturer certificates. This is opposed to a cm/manufacturer certificate that is chained to the DOCSIS root certificate. If not specifically configured, the default is not to allow.

Privacy must be configured at the cable level and not at the MAC domain level.

Examples

To enable/disable a self-signed CM certificate:

```
cable privacy accept-self-signed-certificate cm {enable disabled}
```

To enable/disable a self-signed manufacturer certificate:

```
cable privacy accept-self-signed-certificate manufacture {enable disabled}
```

To remove a self-signed CM certificate:

```
no cable privacy accept-self-signed-certificate cm
```

To remove a self-signed manufacture certificate:

```
no cable privacy accept-self-signed-certificate manufacture
```

To remove both a self-signed CM certificate and a self-signed manufacture certificate:

```
no cable privacy accept-self-signed-certificate
```

cable privacy eae-exclude

Use the `cable privacy eae-exclude` command to exclude cable modem(s) from Early Authentication and Encryption (EAE) process.

`cable privacy eae-exclude` *id* `mac-address` *cm-mac-addr-pattern* `mac-address-mask` *cm-mac-addr-mask*

To remove cable modems from the exclusion list, use one of the **no** forms of the command.

To remove a single entry:

`no cable privacy eae-exclude` *id*

To remove all entries:

`no cable privacy eae-exclude`

Syntax description

id	An integer number in the range 1 - 4294967295. This key uniquely identifies the exclusion MAC address rule.
cm-mac-addr pattern	This field identifies the CM MAC address pattern. A match is made when a CM MAC address bitwise ANDed with the cm-mac-addr-mask field equals the value of this field. The default is "0000.0000.0000".
cm-mac-addr mask	This field identifies the CM MAC address mask and is used with the cm-mac-addr-pattern field. The default is "ffff.ffff.ffff".

Command mode

Config mode.

Usage guidelines

Use the above command to exclude CM/CMs from the EAE process. Privacy must be configured at the cable level and not at the MAC domain level.

Examples

The following example shows how to configure exclusion entries.

```
cable privacy eae-exclude 1 mac-address aaaa.aaaa.aaaa
cable privacy eae-exclude 2 mac-address bbbb.bbbb.bbbb mac-address-mask
 ffff.ffff.0000
cable privacy eae-exclude 3
```

Related information

cable mac-domain * eae

cable privacy hotlist

Use the `cable privacy hotlist` command to revoke active authorization certificates. To remove certificates from the revocation list, use the **no** form of the command.

`cable privacy hotlist` [{ `cm` *cm-mac-addr* | `manufacturer` *serial-number* }]
`no cable privacy hotlist` [{ `cm` *cm-mac-addr* | `manufacturer` *serial-number* }]

Syntax description

cm-mac-addr	The MAC address of a CM to revoke CA. A list of individual CM MAC-addresses to revoke the authorization certificate.
serial-number	A list of manufacturer certification serial numbers to revoke. This is a string of length 1..255. The following are valid characters: • All letters from a to z, both upper and lower case • All digits 0 to 9 • Dash (-)

Command mode

Config mode.

Usage guidelines

After running the command, you must run the commit command. To see a list of all currently revoked certificates, run the *show running-config cable privacy hotlist* command. Privacy must be configured at the cable level and not at the MAC domain level.

NOTE: Although this command blocks CMs from registering with the CMTS, it will not block DHCP traffic from the CM. To do this, use the `cable modem deny` command.

Examples

The following example shows how to configure a hotlist for three manufacturer serial numbers and for two CMs.

```
cable privacy hotlist manufacturer harSER-FA45D0C1
cable privacy hotlist manufacturer harSER-FA45D0C2
cable privacy hotlist manufacturer harSER-FA45D0C3
cable privacy hotlist cm 0020.a324.18eb
cable privacy hotlist cm 0020.a324.5c87
commit
```

Related information

show running-config cable privacy hotlist

cable modem deny

cable privacy skip-certificate-expiration-time

Use the `cable privacy skip-certificate-expiration-time` command to manage expired Manufacturer CA certificates.

`cable privacy skip-certificate-expiration-time [ cm | manufacturer ] [ enable | disable ]`

Syntax description

`cm`	Enable/Disable CM end-date certificate check
`manufacturer`	Enable/Disable manufacturer end-date certificate check

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

If skipping expiration time is enabled, then the following happens:

- CMs with expired certificates remain online.
- Expired CM/CA certificates are marked as **Active**
- Show commands display the certificate expiration date with a corresponding indication that theexpiration date is being ignored.

If skipping expiration time is disabled, then the following happens:

- Only affected CMs are reset.
- Expired CM/CA certificates are marked as Expired
- CMs with expired certificates are offline

Examples

The following command enables expired CM certificates to be ignored:

```
cable privacy skip-certificate-expiration-time cm enabled
```

cable proto-throttle

Use the `cable proto-throttle` command to configure which upstream protocols are throttled. The command configures the total rate and burst per MAC address for all chosen protocols. To cancel throttling, use the **no** form of the command.

`cable proto-throttle [{arp | nd | dhcp | dhcpv6 | igmp | mld  | rip | total | other}] rate-pps` *rate-pps* `max-burst-pkts` *burst*
`no cable proto-throttle [{arp | nd | dhcp | dhcpv6 | igmp | mld | rip | total | other}] rate-pps` *rate-pps* `max-burst-pkts` *burst*

Syntax description

rate-pps	The number of packets per second allowed for the specified protocol. The valid range is from 1 - 64, and the default value is 8.

max-burst-pkts	The maximum number of packets allowed in a single burst. The valid range is 1 - 64, and the default value is 8.

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Example

The following defines a default rate of 32 and a maximum burst rate of 16 for the arp, nd, and dhcp protocols:

```
cable proto-throttle arp nd dhcp rate-pps 32 max-burst-pkts 16
```

Related information

clear cable proto-throttle counters

show cable proto-throttle

cable provisioning core-ip-address-pool

Use the `cable provisioning core-ip-address-pool` command series to define these CORE provisioning parameters:

- pool count: the number of CORE IP addresses in the CORE IP address pool
- start IPV4 address: the first IPv4 address in the IP address pool
- start IPV6 address: the first IPv6 address in the IP address pool

Use the **no** form of each command in the series to remove the current IP address pool configuration.

The `cable provisioning core-ip-address-pool` command series includes these commands:

- pool count
  `cable provisioning core-ip-address-pool count` *count*
  `no cable provisioning core-ip-address-pool count`
- start IPV4 address
  `cable provisioning core-ip-address-pool start-ipv4-addr` *ipv4-address*
  `no cable provisioning core-ip-address-pool start-ipv4-addr`
- start IPV6 address
  `cable provisioning core-ip-address-pool start-ipv6-addr` *ipv6-address*
  `no cable provisioning core-ip-address-pool start-ipv6-addr`

Syntax description

`count` *count*	<enum: integer 1 or higher> Default 4 Mandatory The number of IP addresses in the pool • Should be equal to or higher than the current actual number of CORE servers
`start-ipv4-addr` *ipv4-address*	<ipv4 address> Default 172.16.255.10 Mandatory The first IPv4 address in the series of IPv4 addresses that are assigned to CORE servers in the cluster • The IPv4 addresses are automatically assigned to the CORE servers in the cluster, starting from this IPv4 address • The maximum number of IPv4 addresses that can be assigned equals the count
`start-ipv6-addr` *ipv6-address*	<ipv6 address> Default fd99:387d:fc20:4fb6::10 Mandatory The first IPv6 address in the series of IPv6 addresses that are assigned to CORE servers in the cluster • The IPv6 addresses are automatically assigned to the CORE servers in the cluster, starting from this IPv6 address • The maximum number of IPv6 addresses that can be assigned equals the count

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

See the descriptions in the *Syntax description* for usage guidelines.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Example

```
admin@CableOS> show running-config cable provisioning core-ip-address-pool
cable provisioning core-ip-address-pool start-ipv4-addr 172.16.186.10
cable provisioning core-ip-address-pool start-ipv6-addr 2711:1004:186:6::10
cable provisioning core-ip-address-pool count 12
```

Related information

cable provisioning cre-

system ipsec tunnel

cable provisioning cre-

Use the `cable provisioning cre-` command series to identify the gateway to the CORE server provisioning interface. This gateway is identified with these parameters:

- ip address: the CRE IPv4 address
- ipv6 address: the CRE IPv6 address
- vlan ID: the CRE VLAN ID

The gateway parameters configured on the CORE must match those on the CRE.

Use the **no** form of each command in the series to remove the CRE provisioning parameter.

NOTE:

These CRE parameters are configured on the CORE server.

The `cable provisioning cre-` command series includes these commands:

- ip address
  `cable provisioning cre-ip-address` *ipv4-address*
  `no cable provisioning cre-ip-address`
- ipv6 address
  `cable provisioning cre-ipv6-address` *ipv6-address*
  `no cable provisioning cre-ip-address`
- vlan ID:
  `cable provisioning cre-vlan-id` *vlan-id*
  `no cable provisioning cre-vlan-id`

Syntax description

ip-address *ipv4-address*	<ipv4 address> Default 172.16.255.1/25 Mandatory The CRE server IPv4 address • This IPv4 address must match the actual CRE server IPv4 address
ipv6-address *ipv6-address*	<ipv6 address> Default fd99:387d:fc20:4fb6::1/64 Mandatory The CRE server IPv6 address • This IPv6 address must match the actual CRE server IPv6 address
vlan-d *vlan-id*	<vlan-id> Mandatory The CRE server vlan-id • This vlan-id must match the actual CRE server vlan-id

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

Use these commands to configure CRE IPv4 address, IPv6 address and VLAN id of a “provisioning” VRF/subnet/…

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Examples

- Pool count: the number of CORE IP addresses in the CORE IP-address pool
- Start IPV4 address: the first IPv4 address in the IP-address pool
- Start IPV6 address: the first IPv6 address in the IP-address pool

Related information

cable provisioning core-ip-address-pool

cable proxy-arp

Use the `cable proxy-arp` command to allow CMTS to respond to all US ARP requests with MAC address of CRE.

```
cable proxy-arp { enabled  | disabled }
```

Default

The default value for the command is disabled.

Command mode

Config mode.

Usage guidelines

To enter the "configured state", the ArpManager should resolve the MAC address of CRE. It uses IP addresses from configuration in following order:

- cable dsi lcce-gw-ip-address
- cable dsi cre-ip-address

When `cable proxy-arp` is enabled, CMTS responds to all US ARP requests with the MAC address of the CRE. The ARP announcement and DAD are dropped. ARPs that come from NSI are forwarded transparently.

IMPORTANT: proxy-arp MUST be enabled with CableOS Cloud-Native. All other systems must NOT enable proxy-arp in production systems; for use in lab systems, contact Harmonic support staff.

Examples

```
cable proxy-arp enabled
cable proxy-arp forward-upstream-arp-replies enabled
cable proxy-arp disabled
cable proxy-arp forward-upstream-arp-replies disabled
```

Related information

cable proxy-nd

cable proxy-nd

Use the `cable proxy-nd` command to enable and disable the ND proxy.

```
cable proxy-arp  [{enabled | disabled}]
cable proxy-arp  [{enabled disabled}]
cable proxy-nd  {enabled  | disabled }
```

Default

The default value for the command is disabled.

Command mode

Config mode.

Usage guidelines

With `cable proxy-nd` enabled, CMTS caches information received in the Router Advertisement (RA) message from the CRE. The router IP and MAC are used as source addresses in response to the Router Solicitation (RS) and the Neighbor Solicitation (NS) that come from the DSI.

The original Router Advertisement message is forwarded down to the DSI and adjusted to DOCSIS limits MTU. The Neighbor Advertisements (NA) are forwarded transparently in both directions.

For vCMTS, the source addresses of NA messages are modified with MDMA, that allows to point all hosts to the MAC address of the SG. proxy-nd is a part of the ONOS integration and MUST be enabled on vCMTS.

IMPORTANT: proxy-nd MUST be enabled with CableOS Cloud-Native. All other systems must NOT enable proxy-nd in production systems; for use in lab systems, contact Harmonic support staff.

Examples

```
cable proxy-nd enabled
cable proxy-nd disabled
cable proxy-nd forward-upstream-solicited-na enabled
cable proxy-nd forward-upstream-solicited-na disabled
```

Related information

cable proxy-arp

cable ptp

Use the `cable ptp` command to configure the 1588 module.

`cable ptp`

Any of the following attributes of the RPD may be configured:

`profile` *profile* `admin-state up | down }` `domain` *domain* `primary-clock ip-address` *ip-address* `gateway-ip` *gateway-ip-address* `secondary-clock ip-address` *ip-address* `gateway-ip` *gateway-ip-address* [`bmca` [*on* | *off*]]

Syntax description

profile	A profile is a specific selection of PTP configuration options that are selected to meet the requirements of a particular application. • g.8275.1: full timing support from the network (multicast) • g.8275.2: partial timing support from the network (unicast)
`admin-state`	The administrative state of the PTP. The default value is **down**.

`domain`	Used to configure the identifier of the administrative domain. For a g.8275.1 profile, valid values are in the range of 24 - 43. For a g.8275.2 profile, valid values are in the range of 44 – 63.
`primary-clock ip`	The IP address of the primary PTP Master. The default value is Null IP address (0.0.0.0).
`primary-clock gateway-ip`	An IP address of a gateway through which the RPD can reach the primary PTP Master. The default value is Null IP address (0.0.0.0).
`secondary-clock ip`	The IP address of the alternate PTP Master. The default value is Null IP address (0.0.0.0). This parameter can be set only if the primary-clock is set.
`secondary-clock gateway-ip`	An IP address of a gateway through which the RPD can reach the alternate PTP Master. The default value is Null IP address (0.0.0.0).
`bmca`	Disables/enables the BMCA on the CableOS Core. It is used to explicitly define the priority of masters. The default value is “on”. When it is disabled (off), the Core locks on the master according to its position in the CLI config. In this case it will first try to lock on the Primary master and if it is absent it will try to lock on the Secondary master.

Default

There is no default for this command.

Command mode

Config mode.

Example

The following is a configuration example:

```
cable ptp domain 44
cable ptp admin-state up
```

cable ptp primary-clock ip 200.200.126.13

Related information

cable template rpd

cable rcp

Use the `cable rcp` command to configure proprietary RCPs.

`cable rcp` *rcp-id*

In Cable RCP configuration mode, any of the following attributes of the RCP may be configured:

`name` *name-string* `center-frequency-spacing-mhz` *freq-spacing* `receive-module` *module-id* `num-adjacent-channels` *num-channels* `num-adjacent-channels` *num-channels* `min-center-frequency-mhz` *min-freq* `max-center-frequency-mhz` *max-freq* `receive-channel` *channel-id* `connectivity` *connectivity* `primary-capable` { *enable* | *disable* }

Syntax description

rcp-id	RCP key. 5 byte hex string space separated. For example: "00 01 a0 b0 d0".
name	A string representing the proprietary RCP. Up to 15 characters.
center-frequency-spacing-mhz	Specify the interval between center SC-QAM frequencies in a Receive Module.
receive-module	Receive module configuration sub-module
module-id	The receive module ID. 1..255.
num-adjacent-channels	If the Receive Module corresponds to a block of adjacent channel center frequencies, this parameter provides the number of such channels in the block. The CM MAY include the Receive Module Adjacent Channels TLV in a Receive Module encoding of an RCP encoding. Omission of this TLV indicates that the CM supports receive channel placement within the complete Receive Module Channel block range. **NOTE:** This TLV is not relevant for DOCSIS 3.1.
min-center-frequency-mhz	The minimum center frequency (MHz) of the first SC-QAM channel of the block
max-center-frequency-mhz	The maximum center frequency (MHz) of the first SC-QAM channel of the block
receive-channel	Receive channel configuration sub-module.
channel-id	The receive channel id. 0..255.
connectivity	Receive Channel Connectivity Capability. BITS encoding with bit position K set to 1 when RC can connect to Receive Module Index K. Bit position 0 is the most significant bit.

primary-capable	Indicates if the channel is primary capable or not

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

See the descriptions in the Syntax description for usage guidelines.

Example

```
admin@CableOS(config)# cable rcp "00 00 00 00 00" name My_RCP
admin@CableOS(config-rcp-00 00 00 00 00)# center-frequency-spacing-mhz 6 name test-
hello receive-module 1 min-center-frequency-mhz 10 max-center-frequency-mhz 20 num-
adjacent-channels 5
admin@CableOS(config-receive-module-1)# receive-channel 1 connectivity 40 primary-
capable enabled
admin@CableOS(config-receive-channel-1)# receive-channel 2 connectivity 40 primary-
capable disabled
admin@CableOS(config-receive-channel-2)# commit
Commit complete.
admin@CableOS> show running-config cable rcp
cable rcp "00 00 00 00 00"
name                         test-hello
center-frequency-spacing-mhz 6.0
receive-module 1
  num-adjacent-channels    5
  min-center-frequency-mhz 10.0
  max-center-frequency-mhz 20.0
!
receive-channel 1
  connectivity    40
  primary-capable enabled
!
receive-channel 2
  connectivity    40
  primary-capable disabled
!
!
```

Related information

show cable rcp

cable mac-domain * rcp use-learned

cable mac-domain * rcp verbose

cable rip allow-subnet

Use the `cable rip allow-subnet` command to specify which RIP subnets are allowed to pass SAV control.

`cable rip allow-subnet` *subnet_ip*

Syntax description

subnet_ip	Enter the subnet IP address and subnet mask in the following format: *x.x.x.x/mask* The mask can be any integer from 1 .. 32

Default

By default, all RIP subnets are accepted.

Command mode

Config

Usage guidelines

Upstream traffic from allowed networks is accepted and for all other RIP advertised subnets, traffic is dropped by SAV control. SAV control is configured for each MAC Domain using the `cable mac-domain <mac-domain id> source-verify [enabled | disabled]` command. By default, it is enabled.

CableOS advertises all upstream RIP packets to CRE without filtering or modification, route filtering rules should be applied on the CRE side.

CableOS on a Cloud Native platform with FIBR network topology does not advertise RIP packets, but parses the RIP message, extracts the routes, and advertises them into BGP. `cable rip allow-subnet` restricts which RIP subnets are advertised into BGP.

Use `cable rip allow-subnet` to allow RIP advertised networks to appear in the SAV control table and the FIBR routing table.

Examples

```
admin@CableOS(config)# cable rip allow-subnet 10.8.0.0/16
admin@CableOS(config)# cable rip allow-subnet 10.25.0.0/16
```

Related information

show cable modem ripv2

cable rip authentication

Use the `cable rip authentication` command to provide an additional layer of security on the network beyond other security features. The **no** version of the command sets auth-mode to no-authentication and clears auth-string and all the keychains.

`cable rip authentication` [`auth-mode` [`other` | `no-authentication` | `simple-password` | `md5`] [`auth-string`] [`keychain` [*accept-lifetime* | *send-lifetime* | *clear-key* | *key-string*]]
`no cable rip authentication`

Syntax description

`auth-mode`	Sets which mode of authentication to use: • *no-authentication* | *other* - both of these parameters mean that authentication will be turned off • *simple-password* - means that a simple character string will be used to verify authentication • *md5* - means that an md5 hash should be created and compared with the appropriate data in the packet to verify authentication
`other`	rip authentication is disabled. RIP packets are treated as if they do not have any authentication information.
`no-authentication`	rip authentication is disabled. RIP packets are treated as if they do not have any authentication information.
`simple-password`	rip authentication is enabled. Password is a simple string of characters that should be equal to the one in the RIP packet. For example: “hhM3%\d5”.
`md5`	rip authentication is enabled. Password is an md5 hash.
`auth-string`	(Required if "simple-password" auth-mode is being used) Sets the 1-16 character string to be checked against another string for simple-password authentication. Extracted from the RIP packet if the rip authentication auth-mode is *simple-password*. Empty by default.

`keychain`	It is possible to create keys each with a unique ID. (Required if "md5" auth-mode is being used) Sets the parameters required to create an md5 hash used for verifying authentication: • *accept-lifetime*- not implemented • *send-lifetime* - not implemented • *clear-key {disabled* | *enabled}* - not implemented. Only clear-key currently • *key-string* - a character string, which is used to create an md5 hash for authentication verification • *key-id* - an integer ID which is compared to the one contained in the RIP packet
accept-lifetime	Not currently used. Default value is 0.
send-lifetime	Not currently used. Default value is 0.
clear-key	Not currently used. Default value is disabled.
key-string	md5 hash to be checked against the one generated from the RIP packet if rip authentication is enabled. Empty by default. Example value: “57D2613D5EE20D7EA7F2B312D95BA9CD”.

Command mode

Config mode.

Usage guidelines

- keychain is a list of structures with different 'key-id's.
- To configure an authentication with a simple password, use auth-string; to configure an authentication that uses md5 hash, use keychain.
- To configure simple password authentication: cable rip authentication auth-mode simple-password auth-string "character string password"
- To configure keychain with id '0' for md5 authentication: cable rip authentication auth-mode md5 keychain 0 *key-string* "character string for md5 hash"
- To configure keychain with id '13' for md5 authentication: cable rip authentication auth-mode md5 keychain 13 *key-string* "another character string for md5 hash"

Examples

```
admin@CableOS(config)# cable rip authentication auth-string hhM3%d5 auth-mode
 simple-password
admin@CableOS(config)# comm
Commit complete.
admin@CableOS(config)#
admin@CableOS> show running-config cable rip authentication
cable rip authentication auth-mode simple-password
cable rip authentication auth-string hhM3%d5
```

```
admin@CableOS>
```

```
admin@CableOS(config)# cable rip authentication auth-mode md5 keychain 1 key-string
 57D2613D5EE20D7EA7F2B312D95BA9CD
admin@CableOS(config-keychain-1)# comm
Commit complete.
admin@CableOS(config-keychain-1)#
admin@CableOS> show running-config cable rip authentication
cable rip authentication auth-mode md5
cable rip authentication auth-string hhM3%d5
cable rip authentication keychain 1
key-string      57D2613D5EE20D7EA7F2B312D95BA9CD
accept-lifetime 0
send-lifetime   0
clear-key       disabled
!
admin@CableOS> conf
Entering configuration mode terminal
admin@CableOS(config)# no cable rip authentication
admin@CableOS(config)# comm
Commit complete.
admin@CableOS(config)#
admin@CableOS> show running-config cable rip authentication
cable rip authentication auth-mode no-authentication
admin@CableOS>
```

cable rpd

Use the `cable rpd` command to enter a mode to configure the attributes of a Remote Phy Device such as the Harmonic Ripple1 or the NSG-Pro 80G12 card.

`cable rpd` *vc:vs*

In Cable RPD configuration mode, any of the following attributes of the RPD may be configured:

`admin-state`
`{up |down}` `description` *descr-string* name *name-string* `template` *rpd-templ-name*`device-type` *devicetype*`mac-address` *rpd-mac-addr* `ptp` domain domain `primary-clock ip ip gateway-ip gateway-ip secondary-clock ip ip gateway-ip gateway-ipaux-cores`*aux-cores-list*

To remove the configuration for the RPD

`no cable rpd` *vc:vs*

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.

`admin-state`	Optional enumerated value { up | down}. The default value is **down**. Administratively configures the RPD operational state. An RPD must be configured as admin-state up in order for the RPD to accept attachment from the RPD. The admin-state down setting may be helpful to enter and verify configuration before the RPD first attaches, and to temporarily force an RPD to detach from the CableOS Core for out-of-band management directly to the RPD.
`description`	*descr-string*: An optional string of length 0..255 printable characters, enclosed in quotes. Default: zero-length string. Operator-defined description of the RPD displayed in certain *show* commands and reported in DOCS-RPHY-MIB as docsRphyRpdPhysEntityDescr.
`name`	*name-string*: Optional string of length 0..16 printable characters without spaces. Default: zero-length string. Operator-defined name of the RPD displayed in certain *show* commands and reported in DOCS-RPHY-MIB as docsRphyRpdPhysEntityAlias.
`template`	*rpd-templ-name*: optional reference to an existing RPD template configured with the cable template rpd rpd-templ-name command. An RPD Template itself references templates for a ds-rf-port, us-rf-port, and mac-domain. The RPD template and its references define the default parameters for all downstream and upstream channels of the RPD. When a cable rpd * template is configured, the CableOS Core omits from show running-config output all attributes within cable ds-rf-port, cable us-rf-port, and cable mac-domain that match the current template values for those attributes. If all attributes match the referenced template, the CableOS Core omits the entire cable ds-rf-port, cable-us-rf-port, and/or cable mac-domain configuration itself from the show running-config output.
devicetype	Enter the device type of the RPD, either *rpd* or *ndfr*. The default is *rpd*.
`mac-address`	*rpd-mac-addr* : Required mac address in the form xxxx.xxxx.xxxx. This configuration must match the "DeviceMacAddress" attribute reported with the GCP protocol when an RPD requests attachment to the CableOS Core in order for the CableOS Core to accept the attachment.

`ptp domain`	Used to configure the identifier of the administrative domain in which the RPD RDTI client operates. For g.8275.1 profile, valid values are in the range of 24 - 43. For g.8275.2 profile, valid values are in the range of 44 – 63.
`primary-clock`	The master clock IP configuration. IP address 0.0.0.0 is used as NULL IP (No primary).
`secondary-clock`	The alternate clock IP configuration. IP address 0.0.0.0 is used as NULL IP (No Alternate). This parameter can be set only if the primary-clock is set.
aux-cores-list	A comma separated list of Auxiliary core IDs for this RPD. The auxiliary core's IP version should be the same as RPD's IP version (IPv4/IPv6).

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

The Harmonic CableOS Core CLI compactly identifies RPDs with two small integers: a virtual chassis and a virtual slot, which mimic the familiar industry concepts of an integrated CMTS chassis and line card. The CableOS Core does not permit an RPD to complete attachment until at least the cable rpd *vc:vs* mac-address rpd-mac-addr attribute has been configured. For the case of an RPHY Shelf card within the NSG-Pro chassis, for example, the 80G12 card, the virtual chassis vc number must identify a physical NSG-Pro chassis and the virtual slot vs number must be the physical slot in the NSG-Pro chassis. For RPHY devices (RPDs) at remote fiber node locations – such as the Harmonic EXO-R – the virtual chassis vc may identify any desired set of RPDs. Harmonic recommends that the virtual chassis identify the set of RPDs assigned to the same IP subnet. The RPDs with the same IP subnet are usually reached from a cable head-end or optical termination hub formerly served by an integrated CMTS. Thus, the virtual chassis number vc is expected to identify a cable head-end or hub. The virtual slot number vs identifies an RPD reached from that hub.

When an RPD attempts to attach to the CableOS Core without a configured cable rpd *vc:vs* mac-address, its IP address and device mac address are listed as **unconfigured** in the output of the show cable rpd command. In this case, the operator can configure the RPD for attachment by assigning a virtual chassis vc based on the RPD's IP address and the next available virtual slot number vs available on the virtual chassis.

Examples

The following example shows how to configure an RPD template with the name *Location1*:

```
cable rpd 1:0
name location1
```

Related information

cable rpd ptp

cable template rpd

cable aux-core

cable rpd early-video

Use the `cable rpd early-video` command to enable or disable the early video feature on the RPD.

`cable rpd` *vc:vs* `early-video { enable | disable }`

Syntax description

`vc`	The configured Virtual Chassis of the RPD, range 1..254.
`vs`	The configured Virtual Slot of the RPD, range 0..254.
`enable | disable`	Enable or disable the feature. Disabled is the default mode.

Default

By default, I08 mode is disabled.

Command mode

Config mode

Usage guidelines

Enabling this feature allows targeted upstream power to be configured according to the R-PHY I08 specification. According to this specification, two TLVs are used to configure the upstream power:

- BaseTargetRxPower (TLV 98.3) specifies a US port's power level as a power density in units of TenthDb per 1.6 Mhz
- TargetRxPowerAdjust (for US ScQAM channels TLV 65.9) specifies the adjust value of the power level in units of relative TenthDb of the BaseTargetRxPower density.

These are the same TLVs that are used to define the US channels in I07 mode. The mode defines which values are placed into the TLVs.

NOTE: If the RPD does not support I08 mode, the Core will configure it in I07 mode, even if I08 mode has been enabled.

Example

The example below shows how to enable the I08 mode:

```
cable rpd 2:0 use-base-target-rx-power enabled
```

cable rpd ip-stack

Use the `cable rpd ip-stack` command to configure the stack mode of a Remote Phy Device such as the Harmonic Ripple1.

```
cable rpd vc:vs ip-stack { dual_stack | ipv4_only | ipv6_only }
```

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
`dual_stack`	In dual stack mode, the RPD sends both dhcpv4 and dhcpv6. If a v6 address is received, the RPD will work in v6 mode and will try to connect to the core with a v6 address. If no v6 address was received and a v4 address was received, the RPD will work in v4 mode. This is the default mode.
`ipv4_only`	Only v4 addresses will be acquired.
`ipv6_only`	Only v6 addresses will be acquired.

Default

The default mode for the command is `dual_stack`.

Command mode

Configuration mode

Usage guidelines

Each separate RPD in the system is configured separately. It is possible to have a mix of IPv4 and IPv6 configurations for multiple RPDs.

The command takes effect from the next reboot of the RPD. It makes no difference if the reboot is cold, warm, or a power-cycle.

When the RPD reboots, it uses the saved `ip-stack` parameter and then clears it. The `ip-stack` parameter is reconfigured again only the next time a GCP connection is established. If the RPD successfully gets an IP address and connects to the Core, it will receive the `ip-stack` configuration again and will save it for the next reboot. If the RPD fails to receive an IP address and therefore cannot connect to the Core, it will reboot. As it did not receive an `ip-stack` configuration this time, it will revert to the default of `dual-stack` after the reboot.

IMPORTANT: For any changes to this configuration to take effect, you MUST reboot the RPD.

Example

The following example sets the RPD in the first slot of the first chassis to work only in IPv6 mode:

```
cable rpd 1:0 ip-stack ipv6_only
```

cable rpd local-user

Use the `cable rpd local-user` command to enable and disable local user login via SSH on the RPD.

`cable rpd` *vc:vs* `local-user { enabled | disabled }`

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.

Default

By default, local user login is enabled.

Command mode

Exec mode.

Usage guidelines

Disabling local user login does not close existing connections, but just disallows any new logins.

Example

```
cable rpd [rpd-id] local-user <enabled|disabled>
```

Related information

cable rpd sshd

cable ssh-public-key default-profile

cable ssh-public-key profile

cable rpd ssh-pk-profile

show cable rpd ssh-public-key

cable rpd * mstp

Use the `cable rpd * mstp` command to connect an RPD to an MSTP ring.

`cable rpd` *vc:vs* `mstp region-id` *region-id* `instance` *instance-id*

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
region-id	Arbitrary Harmonic CLI index limit for testing.
instance-id	Valid values are from 1..63 (0 is a reserved instance). The MSTP protocol limits to 64 instances per region. When setting MSTP instances on the configuration they must start with 1 and be consecutive numbers.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

This command is used in conjunction with the `spanning-tree mstp` command. For more details, see the *CableOS User Guide*.

Examples

The example below configures two rings on the same CRE/DAAS, the first ring has two RPDs and second ring has four RPDs

```
cable rpd 1:0
  mstp region-id 1 instance 1
cable rpd 2:0
  mstp region-id 1 instance 1

cable rpd 10:0
  mstp region-id 1 instance 2
cable rpd 11:0
  mstp region-id 1 instance 2
cable rpd 12:0
  mstp region-id 1 instance 2
cable rpd 13:0
  mstp region-id 1 instance 2
```

Related information

spanning-tree mstp

show cable rpd spanning-tree

set cable rpd spanning-tree

cable rpd nit-replace

Use the `cable rpd nit-replace` command to activate the nit-replace feature and assign a replace profile to a specific RPD.

`cable rpd` *vc:vs* `nit-replace` *profile*

To disable the feature, use the **no** version of the command:

`no cable rpd` *vc:vs* `nit-replace` *profile*

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
profile	The unique profile ID.

Default

By default, this feature is disabled.

Command mode

Config mode.

Usage guidelines

You can only assign a nit-replace profile to an RPD with a video-type of asynchronous (video-type = async-video). Assigning a nit-replace profile to an RPD with sync-video will cause an error event to be triggerd, with a request to switch to async-video and then reboot the RPD for the changes to take place.

Examples

The example below shows assigning nit-replace profile number 18 to the RPD at 2:0:

```
cable rpd 2:0 nit-replace 18
```

Related information

cable nit-replace

cable rpd ptp

Use the `cable rpd ptp` command to configure the 1588 module.

`cable rpd` *vc:vs* `ptp`

In Cable RPD configuration mode, any of the following attributes of the RPD may be configured:

`profile` *profile* `admin-state up | down }  domain` *domain* `primary-clock ip-address` *ip-address* `gateway-ip` *gateway-ip-address* `secondary-clock ip-address` *ip-address* `gateway-ip` *gateway-ip-address* `[ mcast-mac` *mcast-mac* `]`

To remove the configuration for the RPD,

`no cable rpd` *vc:vs* `ptp`

Syntax description

`vc`	The configured Virtual Chassis of the RPD, range 1..254.
`vs`	The configured Virtual Slot of the RPD, range 0..254.
profile	A profile is a specific selection of PTP configuration options that are selected to meet the requirements of a particular application. • g.8275.1: full timing support from the network (multicast) • g.8275.2: partial timing support from the network (unicast)
`admin-state`	The administrative state of the PTP on the RemotePhy. The default value is **down**.
`domain`	Used to configure the identifier of the administrative domain in which the RPD RDTI client operates. For a g.8275.1 profile, valid values are in the range of 24 - 43. For a g.8275.2 profile, valid values are in the range of 44 – 63.
`primary-clock ip`	The IP address of the primary PTP Master. The default value is Null IP address (0.0.0.0).
`primary-clock gateway-ip`	An IP address of a gateway through which the RPD can reach the primary PTP Master. The default value is Null IP address (0.0.0.0).
`secondary-clock ip`	The IP address of the alternate PTP Master. The default value is Null IP address (0.0.0.0). This parameter can be set only if the primary-clock is set.
`secondary-clock gateway-ip`	An IP address of a gateway through which the RPD can reach the alternate PTP Master. The default value is Null IP address (0.0.0.0).

mcast-mac	Optional. If the profile is g.8275.1, this parameter defines the Master multicast MAC address. • One hop: 01:80:C2:00:00:0E • Forwardable: 01:1B:19:00:00:00

Default

There is no default for this command.

Command mode

Config mode.

Example

The following are various configuration examples:

```
admin@CableOS> config
admin@CableOS(config)# cable rpd 1:0
admin@CableOS(config-rpd-1:0)# cable ptp domain 44
admin@CableOS(config-rpd-1:0)# cable ptp admin-state up
admin@CableOS(config-rpd-1:0)#cable ptp primary-clock ip 200.200.126.13
```

```
admin@CableOS> config
admin@CableOS(config)# cable rpd 2:0
admin@CableOS(config-rpd-2:0)# ptp profile g.8275.1
admin@CableOS(config-rpd-2:0)# ptp mcast-mac 01:80:C2:00:00:0E
admin@CableOS(config-rpd-2:0)# ptp domain 42
admin@CableOS(config-rpd-2:0)# commit
```

Related information

cable template rpd

show cable rpd * ptp

cable rpd ptp dscp

cable rpd ptp dscp

Use the `cable rpd ptp dscp` command to configure the transport Differentiated Services Codepoint (DSCP) value.

`cable rpd` *vc:vs* `ptp dscp` *dscp*

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.

dscp	The DSCP value. This must be in the range of 0 - 63.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

Setting the DSCP flag in the Traffic Class field if the IP header enables the provisioning of low-latency for PTP traffic.

If the transport **dscp** value is not set on the Core, by default its values will be **46** (**expedited forwarding** which has **TOS Precedence 'Critical'**). The current DSCP value on RPD can be checked with the `show ptp status` command in the RPD CLI.

NOTE: The transport DSCP value is only relevant for the PTP g.82575.2 profile.

Examples

The example below shows the configuration of the DSCP value to 40:

```
admin@CableOS> config
Entering configuration mode terminal
admin@CableOS(config)# cable rpd 2:0
admin@CableOS(config-rpd-2:0)# ptp dscp 40
admin@CableOS(config-rpd-2:0)# commit
```

Related information

cable rpd ptp

cable rpd sfp port

Use the `cable rpd sfp port` command to configure the RPD's SFP port.

`cable rpd sfp port` *port* `[ shaper { enabled | disabled } ] [ rate` *rate* `] [ admin-state { up | down } ] [ vlan-access` *vlan-id* `] [ vlan-member-list` *vlan-member-list* `]`

Syntax description

port	The Pebble SFP port for traffic shaping, either port 1, 2, or 3.
`shaper enabled|disabled`	Enable or disable traffic shaping for the port

rate	The rate in Mbps that limits the input or output transmission rate of a class of traffic. Valid range 1000 ... 10000.
`admin-state up|down`	The admin state can be either `up` or `down`.
vlan-id	The vlan ID.
vlan-member-list	A comma separated list of VLANs that should be forwarded from the *port* without any decapsulation. There must be no overlap between the `vlan-access` and the `vlan-member-list`. The range of valid entries is 200 … 4000

Default

The SFP has the following default values:

- The default shaper value is enabled.
- The default shaper rate value is 10000
- Port 1 must be configured with admin-state up and it cannot be changed or deleted

Command mode

Config mode.

Usage guidelines

Traffic shaping is a technique that allows you to control the speed of traffic that is leaving an interface. This way, you can match the flow of the traffic to the speed of the interface receiving the packet.

A shaper typically delays excess traffic using a buffer, or queueing mechanism, to hold packets and shape the flow when the data rate of the source is higher than expected.

Flow control is enabled when the shaper is enabled. When the shaper is set to a rate of 10G, flow control is enabled while the shaper is effectively disabled. Shaper enabled set to 10G (default value) is the recommended setting for Pebble SFP ports connected to VNS devices.

This is also the command that is used to enable a second Ethernet port to work in Daisy chain mode. To enable daisy chain all that is needed is to enable SFP 2 on all chained RPDs except for the last one in the chain, as shown in the example.

The SFP configuration has the following restrictions:

- The port 1 admin-state must be up
- Vlan access cannot be configured on port 1 and port 2
- When vlan access is configured, admin-state down cannot be configured

IMPORTANT: For any changes to this configuration to take effect, you MUST reboot the RPD.

Example

The following shows a configuration example:

```
cable rpd 1:0
sfp port 1
  shaper enabled rate 1234
  !
sfp port 2
shaper enabled rate 2345
!
sfp port 3
  shaper disabled rate 9999
!
```

To enable a daisy chain, you must enable SFP 2 on all chained RPDs except the last RPD in the chain:

```
cable rpd 122:1
sfp port 2
admin-state up
```

To add a list of VLANs for a VLAN member list on port 3:

```
cable rpd 1:0
   sfp port 3
     vlan-access 200
     vlan-member-list 300,444,1200
```

Related information

cable md-downstream-qos-profile

cable md-upstream-qos-profile

cable rpd sshd

Use the `cable rpd sshd` command to enable and disable the SSH Daemon on the RPD.

`cable rpd` *vc:vs* `sshd enabled | disabled`

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
enabled	Enables the SSH Daemon on the RPD.
disabled	Disables the SSH Daemon on the RPD.

Default

By default, the SSH Daemon is enabled.

Command mode

Exec mode.

Usage guidelines

If the SSH Daemon is active, disabling the Daemon will not close it, but just not allow any new SSH connections.

Example

```
cable rpd [rpd-id] sshd <enabled|disabled>
```

Related information

cable rpd local-user
cable ssh-public-key default-profile
cable ssh-public-key profile
cable rpd ssh-pk-profile
show cable rpd ssh-public-key

cable rpd ssh-pk-profile

Use the `cable rpd ssh-pk-profile` command to allocate an SSH access profile to an RPD.

`cable rpd` *vc:vs* `ssh-pk-profile` *profile-name*

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
profile-name	Enter the name of the profile to be applied to the RPD

Default

This command has no default value.

Command mode

Configuration mode

Usage guidelines

Whenever the system identifies a change in the profile configuration (change in the profile or assignment of a profile to an RPD), it will update the relevant RPDs with the new public key. All configured public keys will be set in the RPD in the file: `~/.ssh/authorized_keys`.

The following data will be sent over GCP for each public key: key type, options string, public key, and comment, where:

- key-type: ecdsa-sha2-nistp256, ecdsa-sha2-nistp384, ecdsa-sha2-nistp521, ssh-ed25519, ssh-dss, ssh-rsa. The default is ssh-rsa
- public key: The public key string
- comment: will be in the format <user>@<core-id>@<timestamp>

When the RPD receives the public key configuration, it will delete all existing public keys received from GCP configuration, and replace them with the new ones. An RPD might have local public keys that were not configured by the core. These profiles must not be deleted.

To distinguish the core configured public keys from RPD existing public keys, the comment field in the ~/.ssh/authorized_keys file is used.

Example

The following example applies a profile called **Basic** to the RPD in chassis 1, slot 0:

```
cable rpd 1:0 ssh-pk-profile Basic
```

Related information

cable rpd local-user

cable rpd sshd

cable ssh-public-key default-profile

cable ssh-public-key profile

show cable rpd ssh-public-key

cable rpd us-spectrum-capture

Use the `cable rpd us-spectrum-capture` command to define the parameters for capturing FFT information.

`cable rpd` *vc:vs* `us-spectrum-capture` *sac-index* `[ destination-ip` *ip-address* `] [ averaging` *averaging* `] [ center-frequency` *frequency* `] [ free-run-duration` *duration-time* `] [ num-bins` *num-bins* `] [ output-format` *format* `] [ repeat-period` *repeat-period* `] [ session-id` *session-id* `] [ span` *span* `] [ trigger-channel-identifier` *trigger-channel-identifier* `] [ trigger-mode` *trigger-mode* `] [ window` *window* `]`

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
sac-index	The Spectrum Analyze Circuit on the RPD number. It is also referred to as the FFT engine number. Valid values are 0 for wide band spectrum capture, 1 and 2 for narrow band capture for RF ports 0 and 1 accordingly.

ip-address	The destination IP address for the captured packets. Both IPv4 and IPv6 addresses can be used.
averaging	Specifies whether the SAC is to average spectral frequency domain sample power. The valid range is 0...255 and the default value is 0.
frequency	The center frequency of the upstream spectrum sample capture in Hz. Valid values: • 0...85000000 for narrow band-FFT • 0...204000000 for wide band-FFT The default value is 0.
duration-time	The length of time (in milliseconds) for which the RPD continues to capture the upstream spectrum. The default value is 10000 (10 seconds).
num-bins	The number of frequency bins in the sample. The valid values are: • 256 • 512 • 1024 • 2048 • 4096 The default value is 4096.
format	Defines the format of the data to be returned from the RPD: Valid values: • timeIQ • fftPower • rawAdc • fftIQ • fftAmplitude • fftDb The default value is **fftPower**.

repeat-period	The interval (in microseconds) between consecutive triggers for upstream sample capture. The valid range is 1...2147483647 and the default value is 100000 (0.1 seconds). **NOTE:** For a repeat -period which is less than 25000 microseconds, FFT will generate full rate of approximately 1600 microseconds.
session-id	The session ID to set in the L2TP packet header.
span	Defines the Frequency span of the upstream spectrum sample capture in Hz. Valid values for wideband FFT: • 102400000 • 204800000 • 409600000 Valid values for narrowband FFT: • 25600000 • 51200000 • 102400000 • 204800000 Default values: • Wideband FFT - 409600000 • Narrowband FFT - 102400000
trigger-channel-identifier	Defines the index of the upstream channel to analyze. The default value is 0.
trigger-mode	Used to configure the trigger mode for the selected SAC. Valid values: • free-running • sid • cm-mac
window	Defines the windowing function that will be used when performing the discrete Fourier transform. Valid values: • rectangular • hann • blackman-harris • hamming The default value is **rectangular**.

Default

This command has no default value.

Command mode

Config mode

Usage Guidelines

To display the configured capture parameters, use the `show running-config cable rpd us-spectrum-capture` command:

```
show running-config cable rpd us-spectrum-capture  Shows parameters for all RPDs and
 Sacs
show running-config cable rpd us-spectrum-capture 0        Show parameters for all
 RPDs and Sac 0
show running-config cable rpd us-spectrum-capture 1        Show parameters for all
 RPDs and Sac 1
show running-config cable rpd us-spectrum-capture 2        Show parameters for all
 RPDs and Sac 2
show running-config cable rpd 1:0 us-spectrum-capture      Show parameters for all
 Sacs and RPD 1:0
show running-config cable rpd 1:0 us-spectrum-capture 0    Show parameters for RPD
 1:0 and Sac 0
show running-config cable rpd 2:0 us-spectrum-capture 1    Show parameters for RPD
 2:0 and Sac 1
show running-config cable rpd 2:0 us-spectrum-capture 2    Show parameters for RPD
 2:0 and Sac 2
```

Example

Below is an example of defining the capture parameters:

```
cable rpd 1:2 us-spectrum-capture 0
  destination-ip 200.200.122.100 session-id 195 num-bins 4096 trigger-count 1 free-
run-duration 30000 repeat-period 500000
cable rpd 1:2 us-spectrum-capture 1
  destination-ip 200.200.122.100 session-id 196 num-bins 4096 trigger-count 1 free-
run-duration 40000 repeat-period 1000000
cable rpd 1:2 us-spectrum-capture 2
  destination-ip 200.200.122.100 session-id 197 num-bins 4096 trigger-count 1 free-
run-duration 20000 repeat-period 500000
cable rpd 1:2 us-spectrum-capture 2
 free-run-duration 20000
cable rpd 1:2 us-spectrum-capture 2
  repeat-period 500000
cable rpd 1:2 us-spectrum-capture 2
  num-bins 4096 free-run-duration 20000 repeat-period 500000
```

Related information

capture preconfigured us-spectrum

cable rpd use-base-target-rx-power

Use the `cable rpd use-base-target-rx-power` command to enable or disable emote PHY Specification version I08 (CM-SP-R-PHY-I08) Upstream RF power compatibility mode on the RPD.

`cable rpd` *`vc:vs`* `use-base-target-rx-power { enabled | disabled }`

Syntax description

`vc`	The configured Virtual Chassis of the RPD, range 1..254.
`vs`	The configured Virtual Slot of the RPD, range 0..254.
`enabled | disabled`	Enable or disable the feature. Disabled is the default mode.

Default

The default value for the command is disabled.

Command mode

Config mode

Usage guidelines

The method used to configure the upstream RF levels depends on whether `use-base-target-rx-power` is disabled or enabled. If it is disabled, then use the `cable us-rf-port us-phy-channel power-level-db` command to set the expected SC-QAM power per channel at the input of the RPHY/ node device and the `cable us-rf-port ofdma-channel target-power-density` command for the expected ofdma power per 1.6Mhz at the input of the RPHY/node device.

If `use-base-target-rx-power` is enabled, then the expected scqam power per 1.6Mhz at the input of the RPHY/node device is `cable us-rf-port base-target-rx-power-dbmv` + `cable us-rf-port us-phy-channel power-adjust-db` and the the expected OFMDA power per 1.6Mhz at the input of the RPHY/node device is `cable us-rf-port base-target-rx-power-dbmv` + `cable us-rf-port ofdma-channel power-adjust-db`.

Examples

Using I08 (`use-base-target-rx-power`) is more intuitive when SC-QAM of different widths and OFDMA are involved. For example, compare the results with the two methods when configuring a flat spectrum of 8dBmV per 6.4Mhz, with: SC-QAM 6.4Mhz + SC-QAM 3.2Mhz + OFDMA:

- `use-base-target-rx-power` disabled (I07 method)
  - 6.4Mhz: power-level-db 8
  - 3.2Mhz: power-level-db 5 // 5dBmV per 3.2Mhz means 8dBmV/6.4Mhz
  - OFDMA: target-power-density 2 // 2dBmV per 1.6Mhz means 8dBmV/6.4Mhz
- `use-base-target-rx-power` enabled (I08 method)
  - base-target-rx-power-dbmv 2 // 2dBmV per 1.6Mhz means 8dBmV/6.4Mhz
  - 6.4Mhz: power-adjust-db 0
  - 3.2Mhz: power-adjust-db 0
  - OFDMA: power-adjust-db 0

Related information

cable us-rf-port * us-phy-channel
cable us-rf-port us-phy-channel power-adjust-db
cable us-rf-port base-target-rx-power-dbmv
cable us-rf-port ofdma-channel power-adjust

cable rpd video-type

Use the cable rpd video-type command to change the video type of a specific RPD.

`cable rpd` *vc:vs* `video-type` *sync_type*

Syntax description

This command has no arguments or keywords.

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
sync_type	The video type of the RPD, either *sync_video* or *async_video*. The default type is *sync_video*.

Default

See the *Syntax Description* section.

Command mode

Config

Usage guidelines

If the operator does not change the default option or configures "sync_video" then both the RPD and theVideo Core should be synchronized with PTP. Each down-channel of the service-group need to be provisioned with the symbol-rate equal to the symbol rate of the appropriated channel of the Video Core. In this mode, RPD compensates only for Video Core and network jitters. It does not touch the MPEG packets encapsulated into L2TP/IP video traffic.

The second option is "async_video". This configuration need to be applied when the Video Code is not synchronized with PTP. In this case, the symbol rate of the video traffic issued by the Video Core is not exactly the same as the symbol rate expected by the RPD. The RPD video processing unit modifies the MPEG packets in this case. It throws MPEG NULL packets of incoming transport streams, performs PCR re-stamping and NULL padding to reach the desired symbol rate.

The changing of the video-type does NOT immediately affect the video processing rules. You need to explicitly run the `reset cable rpd` to complete the changing of the video type. Until it is reset, the RPD will behave according to the previously configured video-type.

The RPD send to the CORE CLI the video-type which is currently being processed. If the configured video-type is different from the currently processed video-type, CORE CLI will display an appropriate message:

```
------------------------------------------------------------------------------------------

Thu Jul 30 07:14:30 2020 Event ID 1073 (RpdVideoTypeMismatch). RPD video type
 mismatch: Actual video type:

`sync_video`; Configured video type: `async_video`. Reset the RPD for the
 configuration to take effect.

------------------------------------------------------------------------------------------
```

IMPORTANT: For any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

```
admin@CableOS(config)# cable rpd 2:0 video-type sync_video
```

Related information

show cable rpd video-type

reset cable rpd

cable rpn

Use the `cable rpn` command to configure the RPN port's return attenuation adjustment in dB.

`cable rpn` *vc:vs* `rpn-port` *port* `return-attn-adjust-db` *return-attn*

To remove the configuration for the RPN:

`no cable rpn` *vc:vs*

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPN, range 0..254.
port	The Ripple upstream port to be configured, from 1-4.
return-attn	Ripple upstream port return attenuation configuration. Values: -31.0..31.0

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

The Return Attenuation to be set on the RF-Tray is calculated by the RPD based on the configured power for the related upstream port. See the power attributes under `cable us-rf-port`.

The RPD calculated Return Attenuation may be adjusted per node upstream port using the `return-attn-adjust-db command`.

Supported Nodes types for this command: Ripple1, Ripple+

Example

The following example relates to a Ripple node and assumes that all the node's RF ports are combined into an RPD 24:0 return input US0 port. In this example the expected nominal input power to the node is 15dBmV per channel for all of the 6 channels.

First configure: `cable us-rf-port 24:0/0 us-phy-channel 0-5 power-level-db 15`

Additionally, if extra attenuation is needed on port 2 only, configure:

```
cable rpn 24:0 rpn-port 1 return-attn-adjust-db 0
cable rpn 24:0 rpn-port 2 return-attn-adjust-db 2
cable rpn 24:0 rpn-port 3 return-attn-adjust-db 0
cable rpn 24:0 rpn-port 4 return-attn-adjust-db 0
```

The resulting expected power on the node's port 2 is 17dBmV while on the rest of the ports it is 15dBmV.

cable scn-restrict

Use the `cable scn-restrict` command to block cable modems with incorrect service classes from registering.

`cable scn-restrict [{enabled | disabled}]`

Syntax description

`enabled`	Allows the blocking of cable modems with incorrect service classes from registering.
`disabled`	Does not allow the blocking of cable modems with incorrect service classes from registering.

Command mode

Exec mode.

Usage guidelines

There are no Usage Guidelines for this command.

Default

The default for the command is **enabled**.

Examples

The following example enables the scn restrict function:

```
cable scn-restrict enabled
```

cable service-class

Use `cable service-class` to create or change a service-class and enter the service-class configuration mode for that service class. Use the **no** form of the command to delete an individual service-class configuration.

`cable service-class` *service-class-name* `[active-timeout] [admitted-timeout] [application-id] [attr-agg-rule-mask] direction [ds-qos-class] [ds-resequencing] [dscp-overwrite] [forbidden-attr-mask] [grants-per-interval] [max-buffer-bytes] [max-buffer-bytes] [max-concat-burst-bytes] [max-latency-usec] [max-sustained-rate-bps] [max-traffic-burst-bytes] [min-assumed-packet-bytes] [min-buffer-bytes] [min-reserved-rate-bps] [multiplier-bytes-requested] [multiplier-contention-request-window] [nominal-grant-interval-usec] [nominal-polling-interval-usec] [peak-traffic-rate-bps] [request-policy-mask] [required-attr-mask] [scheduling-type] [target-buffer-bytes] [tolerated-grant-jitter-usec] [tolerated-poll-jitter-usec] [tos-and-mask] [tos-or-mask] [traffic-priority] [unsolicited-grant-size-bytes]`
`no cable service-class` *service-class-name* [`snmp-index` *snmp-index*]

The system enters the specified service-class prompt:

`srv-class` *service-class-name*

Use the template form `cable template service-class` to enter the global service-class configuration mode.

Syntax description

service-class-name	<string: 1...15 characters> Service Class Name

[snmp-index]	<snmp-index: integer 1...1024> Optional The SNMP MIB index value for the *service-class-name*. If omitted when a new *service-class-name* is created, the COS CORE automatically assigns the next available name. If specified on input for an existing *service-class-name*, it must match the existing *snmp-index* for the *service-class-name*. The COS CORE rejects an attempt to change the *snmp-index* for a *service-class-name.*
`[active-timeout]`	<integer, seconds: 0...65535> Default 0 The template for the Timeout for the Active QoS Parameters attribute of the DOCSIS QoS Parameter Set, in seconds.
`[admitted-timeout]`	<integer, seconds: 0...65535> Default 200 The template for the Timeout for the Admitted QOS Parameters attribute of the QoS Parameter Set, in seconds.
`[application-id]`	<integer: 0...2^32-1> Default 0 The template for the Application Identifier attribute of a QoS Parameter Set.
`[attr-agg-rule-mask]`	<hex-string: 8> Default 0x00000000 The template for the Service Flow Attribute Aggregation Rule Mask attribute of the QoS Parameter Set (TLV [24/25].33).
`direction`	<enum {downstream | upstream}> Mandatory Specifies the direction of service flows to which the *service-class-name* applies.
`[ds-qos-class]`	<string: ds-qc-name 1...15 characters> Optional Maps the *service-class-name* to a downstream QOS class as configured in **cable ds-qos-class** *ds-qc-name.*

`[ds-resequencing]`	<enum {resequencing-dsid | no-resequencing-dsid}> Default resequencing-dsid The template for the Downstream Resequencing attribute of a downstream QoS Parameter Set (TLV 25.17). When set to **resequencing-dsid**, the COS CORE adds a sequence number to the extended header of packets forwarding on a downstream bonded service flow. When set to **no-resequencing-dsid**, the COS CORE omits the sequence number from such packets.
`[dscp-overwrite]`	<integer: -1 **|** 0...63> Default -1 Specifies a template for the IP Type of Service (DSCP) Overwrite attribute of a QoS Parameter Set (TLV [24/25].23), and is structured so as to define the overwrite of a DSCP field per RFC3260. When set to **-1**, the corresponding **tos-and-mask** byte of TLV [24/25].23 is set to be **'FF'H** and the **tos-or-mask** byte of TLV [24/25].23 is set to **'00'H**. When set in the range of **0...63**, the **tos-and-mask** value is **'03'H** and the **tos-or-mask** value is this attribute value shifted left by two bit positions.
`[forbidden-attr-mask]`	<quoted string bits: 0...255> which contains a list of **bitname**s, each separated by a blank space. Default is no value (empty). **bitname** is one of: **bonded**, **low-latency**, **high-availability**, **reserved-3, reserved-4**, … **reserved-15**, **operator-16**, **operator-17**, … **operator-31**. This string is converted to a 32-bit Service Flow Forbidden Attribute Mask (TLV [24/25].32) of a QOS Parameter Set.
`[grants-per-interval]`	<integer: 0...127> Default 0 The template for the GrantsPerInterval attribute of an upstream QoS Parameter Set (TLV 24.22).
`[max-buffer-bytes]`	<integer, bytes: 0...2^32-1> Default 2^32-1 The template for the Maximum Buffer attribute of a QoS Parameter Set (TLV [24/25].35.3).

`[max-concat-burst-bytes]`	<integer, bytes: 0...65535> Default 1522 The template for the Maximum Concatenated Burst attribute of the QoS Parameter Set, in bytes (TLV 24.14). Specifies the maximum concatenated burst (in bytes) that is allowed a Service Flow when not operating in Multiple Transmit Channel (MTC) mode. Calculated from the FC byte of the Concatenation MAC Header to the last CRC in the concatenated MAC frame. A value of **0** means there is no limit.
`[max-latency-usec]`	<integer, microseconds: 0...2^32-1> Default 0 The template for the Maximum Downstream Latency attribute of a QoS Parameter Set (TLV 25.14).
`[max-sustained-rate-bps]`	<integer, bps: 0...2^32-1> Default 0 The template for the Maximum Sustained Traffic Rate parameter of a QoS Parameter Set, expressed in bits per second (TLV [24/25].8). The Maximum Sustained Traffic Rate parameter is the rate **R** of a token-bucket-based rate limiter for packets. It takes into account all DOCSIS MAC frame PDU data of a service flow from the byte following the MAC header HCS to the end of the CRC, including every PDU in the case of a Concatenated MAC Frame. This parameter is applied after Payload Header Suppression; it does not include the bytes suppressed for PHS. The COS CORE limits the number of bytes forwarded on an SF during any time interval T by Max(T), as described in the expression: `Max(T) = T * (R / 8) + B` where the parameter **B** (in bytes) is the Maximum Traffic Burst parameter of the QoS Parameter Set, which has a template in a service-class configured as **burst-max** attribute. See (MULPI) for caveats regarding the verification of token bucket operation for bonded service flows.
`[max-traffic-burst-bytes]`	<integer, bytes: 1522...2^32-1> Default 3044 The template for the Maximum Traffic Burst parameter of a QoS Parameter Set, in bytes (TLV [24.25].9). The Maximum Traffic Burst parameter specifies the token bucket size B (in bytes) for a service flow, as described for the **max-traffic-rate** attribute.

`[min-assumed-packet-bytes]`	<integer, bytes: 0...65535> Default 512 for downstream, 128 for upstream. The template for the Assumed Minimum Reserved Rate Packet Size parameter of a QoS Parameter Set, in bytes (TLV [24/25].11). When this parameter is omitted in a QoS Parameter Set, the COS CORE uses a Harmonic-proprietary default value of 512 bytes in the downstream direction and 128 bytes in the upstream direction.
`[min-buffer-bytes]`	<integer, bytes: 0...2^32-1) Default 0 The template for the Minimum Buffer attribute of a QoS Parameter Set (TLV [24/25].35.1).
`[min-reserved-rate-bps]`	<integer, bps: 0...2^32-1> Default 0 The template for the Minimum Reserved Traffic Rate parameter of a QoS Parameter Set, in bits per second (TLV [24/25].10). This QoS parameter specifies the minimum rate, in bits per second, reserved for a service flow. The value of the Minimum Reserved Traffic Rate parameter is calculated from the byte following the MAC header HCS to the end of the CRC, including every PDU in a Concatenated MAC Frame. If this parameter is omitted, then it defaults to a value of 0 bits per second (that is, no bandwidth is reserved for the flow). For purposes of admission control, DOCSIS overhead is calculated assuming the size of all packets is the QoS parameter Assumed Minimum Reserved Rate Packet Size, which has a service-class template attribute configured as **min-reserved-packet**.
`[multiplier-bytes-requested]`	<integer 1 | 2 | 4 | 8 | 16 > Default 4 The template for the Multiplier to Number of Bytes Requested attribute of an upstream QoS Parameter Set (TLV 24.26).
`[multiplier-contention-request-window]`	<integer, eighths: 4...12> Default 8 The template for the Multiplier to Contention Request Backoff Window attribute of the QoS Parameter Set (TLV 24.25).
`[nominal-grant-interval-usec]`	<integer, microseconds: 0...2^32-1> The template for the Nominal Grant Interval attribute of an upstream QoS Parameter Set (TLV 24.20).

`[nominal-polling-interval-usec]`	<integer, microseconds: 0...2^32-1> Default 0 The template for the Nominal Polling Interval attribute of the QoS Parameter Set (TLV 24.17). The value of this parameter specifies the nominal interval (in microseconds) between successive unicast request opportunities for this Service Flow on the upstream channel. This parameter is typically suited for Real-Time and Non-Real-Time Polling Service.
`[peak-traffic-rate-bps]`	<integer: 0...2^32-1> The template for the PeakTrafficRate attribute of a QoS Parameter Set (TLV [24/25].27).
`[request-policy-mask]`	<hex-string: 8> Default 0x00000000 Hexadecimal representation (with leading 0x). The template for the Request/Transmission Policy attribute of an upstream QoS Parameter Set (TLV 24.16).
`[required-attr-mask]`	<quoted string bits: 0...255> which contains a list of **bitname**s, each separated by a blank space. **bitname** is one of: **bonded**, **low-latency**, **high-availability**, **reserved-3, reserved-4**, … **reserved-15**, **operator-16**, **operator-17**, … **operator-31**. This string is converted into a 32-bit Service Flow Required Attribute Mask (TLV [24/25].31) of a QoS Parameter Set.
`[scheduling-type]`	<enum {best-effort | nrtps | rtps | ugs-ad | ugs}> Default best-effort The template for the Service Flow Scheduling Type attribute of an upstream QoS Parameter Set (TLV 24.15).
`[target-buffer-bytes]`	<integer, bytes: 0...2^32-1) Default 0 The template for the Target Buffer attribute of a QoS Parameter Set (TLV [24/25].35.2). If this parameter is set to **0**, the CM or CMTS automatically selects a buffer size within the range of the Minimum and Maximum Buffers.
`[tolerated-grant-jitter-usec]`	<integer, microseconds: 0...2^32-1> Default 0 The template for the Tolerated Grant Jitter attribute of the QoS Parameter Set, in microseconds (TLV 24.21).
`[tolerated-poll-jitter-usec]`	<integer, microseconds: 0...2^32-1> Default 0. The template for the Tolerated Poll Jitter attribute of an upstream QoS Parameter Set, in microseconds (TLV 24.18).

`[tos-and-mask]`	<hex-string: 2> Default 0xFF The template for the **tos-and-mask** byte of the IP Type-of-Service (DSCP) attribute of a QoS Parameter Set (TLV [24/25].23).
`[tos-or-mask]`	<hex-string: 2> Default 0x00 The template for the **tos-or-mask** byte of the IP TOS (DSCP) Overwrite attribute of the QoS Parameter Set (TLV [24/25].23). It is automatically set after any change to the **dscp-overwrite** attribute of the SCN.
`[traffic-priority]`	<integer 0...7> The template for the Traffic Priority attribute of a QoS Parameter Set (TLV [24/25].7). Higher numbers indicate a higher priority.
`[unsolicited-grant-size-bytes]`	<integer: 0...65535> Default 0 The template for the Unsolicited Grant Size attribute of an upstream QoS Parameter Set (TLV 24.19).

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

A DOCSIS service-class is a named template of QoS parameters. The service class names are referenced in DOCSIS CM configuration files, DOCSIS PacketCable protocols, and IPDR. Because IPDR does not report individual QoS parameters, it is recommended that operators using IPDR configure a service-class-name for each subscriber tier of service.

The COS CORE supports configuration of up to 1024 named service classes.

cable service-flow activity-timeout

Use the `cable service-flow activity-timeout` command to configure the activity timeout for dynamic service flows in DOCSIS environments. To remove the activity timer once configured, use the **no** form of this command.

To configure the activity timeout:

```
cable service flow activity-timeout n
```

To remove the activity timer:

```
no cable service flow activity-timeout [<n>]
```

Syntax description

n	The timeout length in seconds. The valid range is 0 - 65535 seconds. Setting the value to 0 configures the service flow to never timeout.

Default

The default value is 0.

Command mode

Config mode.

Usage guidelines

Setting this value to 0 configures the service flow to never timeout.

NOTE: The `cable service-flow` command is not a valid command by itself. It will return a syntax error: incomplete path.

IMPORTANT: For any changes to this configuration to take effect, you MUST reboot the RPD. Alternatively, you can set the MAC Domain down and up again.

Example

The following example configures a 10 minute activity timeout for dynamic service-flows:

```
admin@CableOS(config)# cable service-flow activity-timeout 600
```

cable service-group

Use the `cable service-group` command to configure video services on CableOS.

`cable service-group <group name>` *dst-address src-address l2tp-session port base down-channel-set ds-rf-port-ref ds-rf-port-ref*

To remove a specific video service group:

```
no cable service-group <group name>
```

To remove all video service groups:

```
no cable service-group
```

Syntax description

dst-address <XXX.XXX.XXX.XXX>	The IP address of the destination RPD for the video signal.
src-address <XXX.XXX.XXX.XXX>	The IP address of the source of the video signal.

l2tp-session port base <0xXXXXXXXX>	The value used to generate the l2tp session IDs: **l2tp session id = port base + 0xPPCC:** Where PP is port index, CC is channel index **0xXXXXXXXX:** Mandatory Hex value field. Minimum value 0x00000000, maximum value 0xFFFF0000
down-channel-set CC,CC-CC	(Mandatory) The set of downstream channels to use for video. **CC,CC-CC** The list or range of channel indexes. Applicable value formats are 1,3,5-7,10 The down-channel cannot be part of 2 or more different service-groups at the same time, or be part of the MAC domain.
ds-rf-port-ref VS:VC\PP-VS:VC\PP	References the downstream ports used for sending video signals. **VS:VC\PP** Slot, Chassis, Port. Must contain at least one element.

Default

This command has no default value.

Command mode

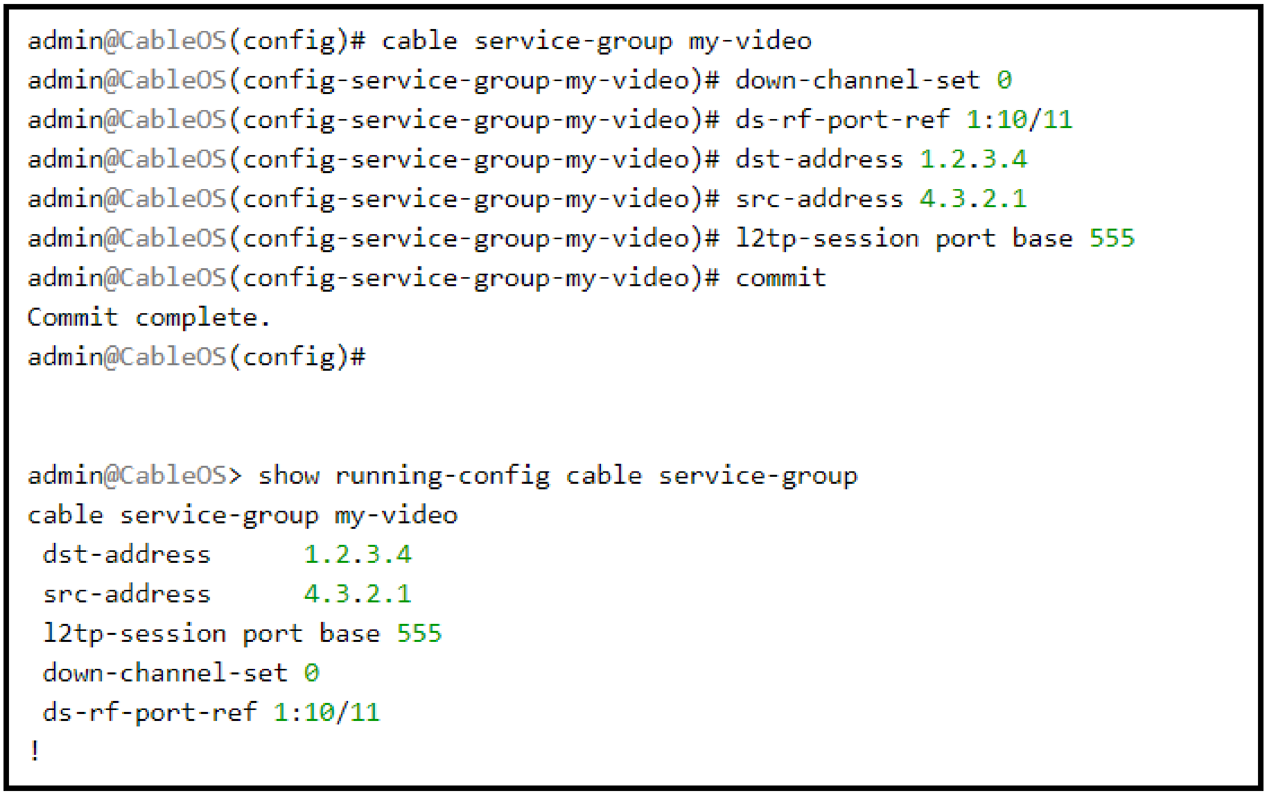
Config mode.

Usage guidelines

See the descriptions in the Syntax description for usage guidelines.

Example

The following example shows how to configure a video-service group:



```
admin@CableOS(config)# cable service-group my-video
admin@CableOS(config-service-group-my-video)# down-channel-set 0
admin@CableOS(config-service-group-my-video)# ds-rf-port-ref 1:10/11
admin@CableOS(config-service-group-my-video)# dst-address 1.2.3.4
admin@CableOS(config-service-group-my-video)# src-address 4.3.2.1
admin@CableOS(config-service-group-my-video)# l2tp-session port base 555
admin@CableOS(config-service-group-my-video)# commit
Commit complete.
admin@CableOS(config)#


admin@CableOS> show running-config cable service-group
cable service-group my-video
 dst-address      1.2.3.4
 src-address      4.3.2.1
 l2tp-session port base 555
 down-channel-set 0
 ds-rf-port-ref 1:10/11
!
```

cable source-verify group

Use the `cable source-verify group` command to enter a mode to configure the rules of a Source Address Verification (SAV) group.

`cable source-verify group` *groupname*

The CableOS Core prompts for each rule of the SAV group with:

`(config-sav-group groupname rule-id)#`

where the rule-id is incremented from 1-4 as each rule is entered.

The only rule accepted at the rule prompt is:

`prefix ipv4-or-ipv6-prefix / prefix-length`

To delete a source-verify group:

`no cable source-verify group` *groupname*

Syntax description

groupname	Name of the SAV prefix group. The groupname is a case-sensitive display string up to 15 characters in length.
`ipv4-or-ipv6-prefix`	Dotted-decimal IPv4 or standard IPv6 address prefix.
prefix-length	0 - 32 for IPv4, 0 - 128 for IPv6.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

An SAV group is a named group of IPv4 or IPv6 prefixes that are exempted from source address verification for upstream packets from a CM. The CM configuration file TLV 43.7.1 specifies an SAV group name applied for the CM. A maximum of 255 SAV groups can be configured on a CableOS Core. Each SAV group may contain up to four IP rules in any combination of IPv4 and IPv6. When modifying an existing SAV group, the entered prefix rules 1-4 replace the existing rules.

The CableOS Core rejects an ipv4-or-ipv6-prefix with non-zero bits after the prefix length. A prefix-length of zero matches all IP addresses.

Example

The following example shows how to configure an SAV group with one IPv4 prefix and one IPv6 prefix:

```
cable source-verify group sav1
rule-id 1 prefix 10.16.0.0/12
rule-id 2 prefix 10::/12
```

Related information

cable source-verify static

cable source-verify static

Use the `cable source-verify static` command to control whether CM-TLVs can define static IP subnet prefixes that are exempted from source address verification (SAV).

```
cable source-verify static {enabled | disabled}
```

Syntax description

`enabled`	The CableOS Core accepts CM TLV 43.7 to indirectly reference or directly define static IP prefixes exempt from source address verification for upstream IP packets from the CM.
`disabled`	The CableOS Core ignores CM configuration file settings of TLV 43.7.

Default

The CableOS Core ignores CM configuration file settings of TLV 43.7.

Command mode

Config mode.

Usage guidelines

The CM configuration file “SAV Authorization Encoding” (TLV 43.7) either indirectly references a group of prefixes named with the cable source-verify group command (TLV 43.7.1) or directly defines an SAV Static Prefix Encoding (TLV 43.7.2). Each prefix identifies an IP subnet for CPEs that are example from source address verification.

The cable source-verify prefix enabled configuration enables the CableOS Core to accept TLV 43.7 as defining prefixes exempted from SAV. Static prefixes exemption applies only when SAV itself is enabled for a mac-domain with the cable mac-domain * source-verify enabled command.

This feature is disabled by default, and TLV 43.7 settings are ignored by the CableOS Core.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Example

The following example shows how to enable the use of static IP prefixes:

```
cable source-verify static enabled
```

Related information

cable source-verify group

cable ssh-public-key default-profile

Use the `cable ssh-public-key default-profile` command to define the default public key for SSH access.

`cable  ssh-public-key default-profile key` *pk-id key-type pk-string pk-description*

Syntax description

pk-id	The default profile can have up to 8 public keys, numbered from 0 - 7.

key-type	Enter one of the following key types: • ecdsa-sha2-nistp256 • ecdsa-sha2-nistp384 • ecdsa-sha2-nistp521 • ssh-ed25519 • ssh-dss • ssh-rsa
pk-string	Enter the key string
pk-description	Enter a meaningful description of the key.

Default

This command has no default value.

Command mode

Configuration mode

Usage guidelines

If an RPD does not have a public-key-profile configured, it will use the default public-key-profile.

Example

```
cable ssh-public-key default-profile
    key [pk-id] <key-type> <pk-string> <pk-description>
```

Related information

cable rpd local-user
cable rpd sshd
cable ssh-public-key profile
cable rpd ssh-pk-profile
show cable rpd ssh-public-key

cable ssh-public-key profile

Use the `cable ssh-public-key profile` command to define public key profiles for SSH access.

`cable ssh-public-key profile` *profile-name* `key` *pk-id key-type pk-string pk-description*

Syntax description

profile-name	The name of the profile.

pk-id	The profile can have up to 8 public keys, numbered from 0 - 7.
key-type	Enter one of the following key types: • ecdsa-sha2-nistp256 • ecdsa-sha2-nistp384 • ecdsa-sha2-nistp521 • ssh-ed25519 • ssh-dss • ssh-rsa
pk-string	Enter the key string
pk-description	Enter a meaningful description of the key.

Default

This command has no default value.

Command mode

Configuration mode

Usage guidelines

If an RPD does not have a public-key-profile configured, it will use the default public-key-profile.

Example

```
cable ssh-public-key profile [profile-name]
    key [pk-id] <key-type> <pk-string> <pk-description>
    ...
```

Related information

cable rpd local-user

cable rpd sshd

cable ssh-public-key default-profile

cable rpd ssh-pk-profile

show cable rpd ssh-public-key

cable sub-bundle

Use the `cable sub-bundle` command to:

- Create a cable sub-bundle under an existing cable bundle
- Set the search priority for the cable sub-bundle
- Define the VLAN of the created cable sub-bundle

- Designate at least one of the following (when one is defined, the rest become optional):
    - CM IP subnet(s)
    - Standard DOCSIS host type(s)
    - Custom host type(s)
    - cm-reg-tlv43

To create a cable sub-bundle:

`cable sub-bundle` *bundleid.subbundleid priority* `cre-vlan-id` *subbundle-vlan-id* [ ] [ ] [ ] [ ]

where:

- You must include at least one of these arguments or the command is not valid (cannot commit):
    - [cm-ip-subnet...]
    - [host-type...]
    - [host-type-custom...]
    - [cm-reg-tlv43]

  See *Syntax description* for the description of these arguments.
- [Optional] ¶ = Press <Enter>

To delete a cable sub-bundle definition:

`no cable sub-bundle` *bundle-id.subbundle-id*

Cable sub-bundles allow enhanced granularity of the services and subnets for devices associated with a cable bundle.

Classification of a device to a sub-bundle can be done either by matching the host type (DOCSIS standard or custom), the CM IP subnet, or the cm-reg-tlv43. The classification is done during the DHCP phase.

Syntax description

cable sub-bundle *bundle-id.subbundle-id*	Mandatory *bundle-id*: the parent cable-bundle ID *subbundle-id*: <Integer 1...15> No default The ID of the cable sub-bundle
priority *priority*	Mandatory <Integer 1...256> No default Two sub-bundles under a single parent bundle cannot have the same priority The sub-bundle search during the DHCP phase is by order of this priority; higher priority sub-bundles are searched first; the first sub-bundle that matches the host criteria is selected, where **1** is the highest priority and **256** is the lowest

cre-vlan-id *subbundle-vlan-id*	Mandatory, No default Valid ID of sub-bundle VLAN Sub-bundle VLANs can repeat across multiple sub-bundle configurations; this means that you can use the same VLAN in multiple sub-bundles You can define only one sub-bundle VLAN in a single sub-bundle definition

`[cm-ip-subnet...]`	The **[cm-ip-subnet]** argument full syntax is as follows: *[cre-irb-addr1/prefix cre-irb-addr2/prefix]…*
	`OR`
	cm-ip-subnet *cre-irb-addr1/prefix*¶
	cm-ip-subnet *cre-irb-addr2/prefix*¶
	`...`
	where ¶ means **“press <Enter>”**

	cm-ip-subnet *[cre-irb-addr1/prefix cre-irb-addr2/prefix]*: When not defined, **any** CM IP subnet is valid for match (the CM’s IP is ignored) You can define multiple CM IP subnets in a sub-bundle; multiple CM IP subnets perform an OR operation for matching services • Multiple cm-ip-subnets are enclosed in square brackets ([ ]) • Multiple cm-ip-subnets can also be defined line-by-line • Examples: cm-ip-subnet [10.20.30.0/24 2000:12:13:51::de/128] OR cm-ip-subnet 10.20.30.0/24 cm-ip-subnet 2000:12:13:51::de/128

`[host-type...]`	The **[host-type]** argument full syntax is as follows: *[{cpe | emta | estb | eps | erouter} {cpe | emta | …}]…*
	`OR`
	host-type *type1*¶
	host-type *type2*¶
	`...`
	where ¶ means **“press <Enter>”**

	host-type *[cpe* | *emta* | *estb* | *eps* | *erouter cpe* | *emta* | *…]*: When both **host-type** and **host-type-custom** (see below) are not defined, any host type is valid for match. You can define multiple host types in a sub-bundle; multiple host types perform an OR operation • Multiple host types are enclosed in square brackets ([ ]) • Multiple host types can also be defined line-by-line • Examples: host-type [cpe estb eps] OR host-type cpe host-type estb host-type eps

`[host-type-custom...]`	The **[host-type-custom]** argument full syntax is as follows: *[custom-type-name1 custom-type-name2…]…*
	`OR`
	host-type-custom *custom-type-name1*¶
	host-type-custom *custom-type-name2*¶
	`...`
	where ¶ means **“press <Enter>”**

	host-type-custom *[custom-type-name1 custom-type-name2…]…* When both **host-type** (see above) and **host-type-custom** are not defined, any host type is valid for match. Enter custom host type defined in parent **cable bundle** You can define multiple custom host types in a sub-bundle; multiple custom host types perform an OR operation • Multiple custom host types are enclosed in square brackets ([ ]) • Multiple custom host types can also be defined line-by-line • Examples: host-type-custom [TIVO1 #Dolby17] OR host-type-custom TIVO1 host-type-custom Dolby17

`[cm-reg-tlv43` *cm-reg-tlv43…* `]`	A list of cm-reg-tlv43 names that were defined in the bundle. You can enter multiple entries, either all on a single line or single entries on multiple lines, pressing enter after each entry. Multiple cm-reg-tlv43s perform an **OR** operation. Multiple names on a single line should be enclosed in single set of square brackets and separated by a single space.
	Examples:
	• A single cm-reg-tlv43 called WSP1 would be entered as `cm-reg-tlv43 [WSP1]`
	• Multiple cm-reg-tlv43s on a single line would be entered as `cm-reg-tlv43 [WSP1 WSP2 WSP3]`
	• Multiple cm-reg-tlv43s on separate lines would be entered as
	`cm-reg-tlv43 [WSP1]`
	`cm-reg-tlv43 [WSP2]`
	`cm-reg-tlv43 [WSP3]`

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

Sub-Bundle Searches and Matches

The order of search is in order of priority, where **1** is the highest priority and **256** is the lowest.

- Host types:
  - The "most selective" host-type is selected; thus, **emta** is more selective than the more generic host type **cpe**
  - A custom host type is the most selective and takes precedence over any of the standard DOCSIS host types (cpe, emta, estb, eps, erouter).
  - If there is no match for the “most selective” host type and the sub-bundle defines the **cpe** host type, a match will be attempted with that **cpe** host type
- Boolean satisfiability
  - If more than one clause is defined, the match is made using an **AND** operation and requires a match in all the classifiers
  - Within a clause, multiple options uses OR operation
    - Note: The host-type-custom clause is considered part of host-type clause and uses OR operation between them
    - Within the cm-reg-43 patterns, if multiple patterns are defined, the match is made using an **OR** operation
  - a missing clause type equals that clause type with wildcard of any value match
    - If only host types (standard or custom) are defined, but no CM IP subnets, the match is made using the defined host type and any CM IP subnet is valid
    - If only CM IP subnets are defined, but no host types (standard or custom), the match is made using the defined CM IP subnets and any host type is valid

DHCP Discover and DHCPv6 Solicitation Phase Search Process

- Used for matching CPEs only
- CMs use only the parent cable bundle during this phase
- Order of search is:
  1. In order of priority, with highest priority sub-bundle searched first, where **1** is the highest priority and **256** is the lowest
  2. Try to match with most selective host type and CM IPv6
  3. Try to match with most selective host type and CM IPv4
  4. Try to match with CPE host type and CM IPv6
  5. Try to match with CPE host type and CM IPv4
  6. Else: not matched. Continue to next sub-bundle
  7. If no match, use parent cable bundle VLAN

DHCP ACK and DHCPv6 Reply Phase Search Process

- Used for matching CMs only
- Order of search is:

1. In order of priority, with highest priority sub-bundle searched first
2. If CM's subnet and host type match, sub-bundle is selected.

   CM host type can match only when any host type is acceptable, that is, when there are no host type and custom host type definitions in the sub-bundle.
3. Else: use parent cable bundle to match

For additional usage guidelines, see the descriptions in the *Syntax description*.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Example

The following example creates a cable sub-bundle that defines both CM IP subnet, host types, and cm-reg-tlv43:

```
cable sub-bundle 1.1 cre-vlan-id 371 priority 1¶
host-type [cpe]¶
host-type-custom [TIVO]
cm-reg-tlv43  [WSP1]¶
cm-ip-subnet [110.69.1.0/24 2000:12:13:51::/124]
```

¶ = Press **<Enter>**

Related information

cable bundle

cable sub-bundle static-cpe-subnet

cable sub-bundle static-cpe

Use the `cable sub-bundle static-cpe` command to define a static IP address for a given CPE device.

`cable sub-bundle` *bundle-id* `static-cpe cpe-ip` *CPE IP address* `cm-mac` *CM MAC address* `cpe-mac` *CPE MAC address*

Syntax description

`bundle-id`	The ID of the Cable Sub-Bundle. Integer in the range 1-15.
`CPE IP address`	The static IP address of the CPE device in nnn.nnn.nnn.nnn format. Only IPv4 addresses are valid.
`CM MAC address`	The full 6 octet MAC address of the cable modem.
`CPE MAC address`	The full 6 octet MAC address of the CPE Device.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Example

The following example sets the IP address 140.99.2.101 as the static address for the CPE AA:BB:CC:DD:EE:FF of CM AA:BB:CC:DD:EE:FF in cable sub-bundle 1:

```
cable sub-bundle 1
static-cpe cpe-ip 140.99.2.101 cm-mac AA:BB:CC:DD:EE:FF cpe-mac AA:BB:CC:DD:EE:FF
```

Related information

cable bundle

cable bundle static-cpe

cable sub-bundle

cable sub-bundle static-cpe-subnet

cable sub-bundle static-cpe-subnet

Use the `cable sub-bundle static-cpe-subnet` command to define a static IP subnet for a given CPE device.

`cable sub-bundle` *bundle-id* `static-cpe-subnet` *subnet* [`timeout` *timeout-min*]

To delete the subnet, use the **no** form of the command. Use one of the following formats:

`cable sub-bundle` *bundle-id*
`no static-cpe-subnet` *subnet*

Or:

`no cable sub-bundle` *bundle-id* `static-cpe-subnet` *subnet*

Syntax description

bundle-id	The ID of the Cable Sub-Bundle. Integer in the range 1 - 15.
subnet	The IPv4 or IPv6 subnet in CIDR notation
timeout-min	The timeout value in minutes. The default value is 240 minutes (4 hours). When the timeout expires, the CPE is removed.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

The configuration item in the parent container is identified by “ipv4 or ipv6 subnet in CIDR notation”, so there can be no duplication in the same bundle or sub-bundle.

Currently there is no validation for overlapping between configured subnets. It is the user’s responsibility to configure the system properly.

Every subnet should be configured under a bundle or a sub-bundle. The traffic of the CPEs will be tagged with the VLAN tag of a particular bundle or sub-bundle.

To be added, the CPE should send some upstream traffic. Downstream packets do not trigger learning of the static CPEs. This is to avoid bogus static CPEs or duplication of static CPEs on different systems.

When the timeout expires the CPE is removed. To be re-added, the CPE should send an upstream packet.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Examples

```
cable sub-bundle 1
static-cpe-subnet 192.168.0.0/16 timeout 86400
```

Related information

cable bundle static-cpe-subnet

cable sub-bundle

cable sub-bundle static-cpe

cable submgmt default active

Use the `cable submgmt default active` command to control whether Subscriber Management is active for a CM when its configuration file omits TLV 35. The **no** form of the command restores the factory default of `disabled`.

```
cable submgmt default active{enabled | disabled}
no cable submgmt default active
```

Syntax description

`enabled`	Subscriber Management is active for a CM when its configuration file omits TLV 35.
`disabled`	Subscriber Management is not active for a CM when its configuration file omits TLV 35.

Default

This feature is disabled by default, and TLV 35 settings are not active.

Command mode

Config mode.

Usage guidelines

Every registered cable modem is considered to have Subscriber Management operation active if either of the following is true:

- If the CM registered with TLV 35 (Subscriber Management Control) AND its byte-3, bit-0 (Active) is 1 (Rel1.0)
- If the CM configuration file omits TLV 35 AND the CableOS Core configuration has `cable submgmt default active` enabled

Example

The following example shows how to enable Subscriber Management:

```
cable submgmt default active enabled
```

Related information

cable filter group

cable submgmt default filter-group

cable submgmt default cpe-max-ipv4 cpe-max-ipv6

show cable filter

cable submgmt default filter-group

Use the `cable submgmt default filter group` command to set default values for cable filter groups. The **no** form of the command sets the group-id for the host-type/direction combination to 0, meaning not defined for host class.

`cable submgmt default filter-group {cm | cpe | mta | stb | ps}{downstream | upstream}` *group-id*
`no cable submgmt default filter-group {cm | cpe | mta | stb | ps} downstream| upstream}` *group-id*

Syntax description

`filter-group`	Specifies a filter group, which can be applied to either upstream or downstream traffic for either a CM or its CPE devices.
`cm`	Specifies that the filter group applies to traffic to or from a CM.
`cpe`	Specifies that the filter group applies to traffic to or from an external CPE device. This setting also applies to any eSAFE type not otherwise supported in this table.
`mta`	Specifies that the filter group applies to traffic to or from a multimedia terminal adapter (mta).
`stb`	Specifies that the filter group applies to traffic to or from a Set-Top Box (stb).
`ps`	Specifies that the filter group applies to traffic to or from a portal server (ps).
`upstream`	Specifies that the filter group applies to the downstream traffic that is going to the specified CM or CPE device.

`downstream`	Specifies that the filter group applies to the upstream traffic that is coming from the specified CM or CPE device.
group-id	Specifies the filter group ID (0 to 254) to be applied for the CM or CPE, downstream or upstream filter. This ID references the filter indexes that are used for rows in the **docsSubMgtPktFilterTable**. A value of 0 indicates that no filtering is used for this particular type of traffic.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

The default values specified with this command are used only if the CM does not specify other values when it registers with the CMTS. If the CM does specify different values at registration time, those values override the default values.

Example

The following example shows how to assign filter group 1 to the upstream of a CPE device and filter group 2 to the downstream:

```
cable submgmt default filter-group cpe upstream 1 downstream 2
```

Related information

cable filter group

cable submgmt default active

cable submgmt default cpe-max-ipv4 cpe-max-ipv6

show cable filter

cable submgmt default cpe-max-ipv4 cpe-max-ipv6

Use the `cable submgmt default max-cpe` command to set the default maximum number of IPv4 hosts and IPv6 hosts forwarded through a CM when cable submgmt default active is configured and TLV-35 is omitted in the CM's configuration file. The **no** form of the command restores the factory default of 4.

`cable submgmt default cpe-max-ipv4` *max-ipv4-cpe* `cpe-max-ipv6` *max-ipv6-cpe*

`no cable submgmt default cpe-max-ipv4` [*max-ipv4-cpe*] `cpe-max-ipv6` [*max-ipv6-cpe*]

Syntax description

max-ipv4-cpe	Integer range 1..16. The default value is 4.

max-ipv6-cpe	Integer range 1..16. The default value is 4.

Default

The default value is 4.

Command mode

Config mode.

Usage guidelines

This configuration does not apply when subscriber management is inactive for a CM; in this case the CableOS Core uses a default MAX_CPE_IPV4 count of 16 IPv4 hosts per CM and a default MAX_CPE_IPV6 as 16 IPv6 hosts and prefixes per CM.

Examples

The following example shows how to set a maximum number of 8 IPv4 hosts and 10 IPv6 hosts for each CM:

```
cable submgmt default cpe-max-ipv4 8 cpe-max-ipv6 10
```

Related information

cable filter group

cable submgmt default active

cable submgmt default filter-group

show cable filter

cable template ds-rf-port

Use the `cable template-ds-rf-port` command to define a common template of parameters and channels for a cable ds-rf-port interface. To delete a ds-rf-template that is no longer referenced, use the **no** form of this command.

`cable template ds-rf-port` *ds-template*
`no cable template ds-rf-port` *ds-template*

After entering the `cable template-ds-rf-port` command, you can then enter the following additional parameters:

Syntax description

ds-template	<string:1..15> The name of the template, up to 15 alphanumeric characters starting with a letter.

admin-state	<enum: *up* | down> Default down. The long-term administrative state of the RF port interface, corresponding to the **adminStatus** SNMP object for the RF port interface. This attribute must be set to **up** for proper operation. When this attribute is set to **down**, the CCAP Core: • discontinues use of the port and all of its channels DOCSIS forwarding • continues to support configuration of ds-rf-port attributes and sub-configurations • sets the SNMP **operStatus** for the RF port and all of its down-channel interfaces to **down**; This object is independently implemented by the CableOS Core. The CableOS Core setting affects only data channel operations; it does not affect video channel operation on the ds-rf-port.
base-channel-power-dbmv	<fixed point dBmV: 0.0 to 60.0> granularity 0.1 dBmV. The base power for each SCQAM channel on the port, where each channel is assumed to be the width configured in the **channel-power-reference-width** setting for this ds-rf-port.
down-channel	<integer down-channel-index: 0...157> Enter cable ds-rf-port * down-channel sub-configuration mode to configure an SCQAM channel on the port.

max-occupied-bw-mhz	<fixed point mhz: 0.0 to 1152.0> default 576.0 MHz. The maximum physical width in megahertz to which RF output power is driven, with a granularity of 0.1 MHz. Smaller values of this parameter permit larger configured values of **base-channel-power-db**. The `max-occupied-bw-mhz` controls the Power Spectral Density out of the digital transmitter. The digital transmission is converted to analog and then amplified to achieve the configured base-channel-power [dBmV] at the device output RF port. A headend/hub system which includes a nonintegrated-services-RPS where the RF is combined with other modulators output (e.g. VOD, linear video) is sensitive to the RPS noise floor. This is since the noise floor elements from all modulators is combined towards the optical transmitter. A higher max-occupied-bw-mhz results in a higher noise floor. Therefore an operator planning to activate for XMHz worth of spectrum (not necessarily contiguous XMHz) should configure the max-occupied-bw-mhz to XMHz or slightly higher. Any change to this attribute results in a rebalance of the digital Vs analog downstream gains in the RPS which in turn results in a momentary service effect to all DS lineup. A node-RPD which usually transmits the entire RF frequency lineup (DOCSIS, VOD, linear) is generally not sensitive to the digital noise floor. Therefore it is recommended to set the max-occupied-bw-mhz according to the node's downstream functional bandwidth (from Diplexer to Amplifier cutoff spec as defined in the nodes' specifications). In some cases where RPD RF output is combined with an Analog Overlay, the max-occupied-bw-mhz is not necessarily equal to the node's downstream functional bandwidth. Recommendation will be provided on a per system basis. An RPD connected to a Primary core (GCPP) which does not configure this attribute will use a default value according to the device-node type.

ofdm-channel	<integer ofdm-channel-index: 0.5> Enter cable ds-rf-port * ofdm-channel sub-configuration mode to configure an OFDM channel on the port. Each **ofdm-channel** with ofdm-channel-index N uses the internal resources of 32 SCQAM down-channels and blocks the configuration of the range of down-channel-index indices from (4-N)32 through (5-N)*32-1. For example, *ofdm-channel 0 prevents the configuration of down-channel 128 through 160.
channel-power-reference-width	<enum: { 6 | 8 }> The assumed width of each SCQAM channel to which the **base-channel-power-db** setting applies. There is no default value.
rf-mute	<enum: enabled | disabled> Default disabled Controls muting of the RF power output for the entire port, corresponding to DRFI diagnostic suppression mode 3 on all output channels.
tilt-adjust	The tilt adjustment (slope) in dB.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Exec mode.

Usage guidelines

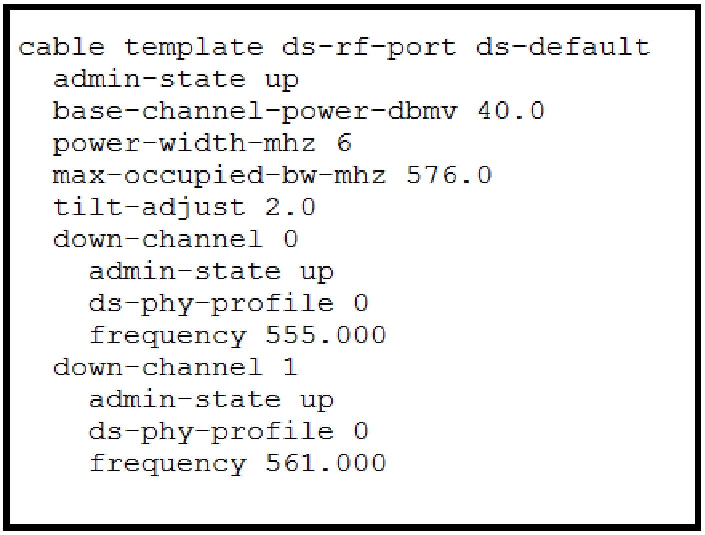
A traditional CMTS CLI configuration file shows the non-default attribute values for each channel for each downstream RF port ("ds-rf-port"). At the typical scale of a CableOS deployment, the traditional approach would require many thousands of lines, most of them duplicates of the same channel plan configuration. The Harmonic CableOS Core introduces the concept of "cable ds-rf-port template" to define a common channel plan configuration. The individual ds-rf-ports refer to a template instead of duplicating configuration lines.

The "cable template ds-rf-port ds-template" configuration defines a named template of default configuration for a generic "cable ds-rf-port". It can be thought of as a set of "programmable default" configurations for the port. The CableOS Core still implements individual attributes for each ds-rf-port and for each channel on that port. Any individual port or channel attribute can "override" the default configuration defined by the template. In effect, a ds-rf-port template corresponds to a "channel plan" for the usage of downstream channels.

For the common case where all downstream RF ports have the same channel plan, only a single ds-rf-port template is required in the configuration. If necessary, additional ds-rf-port templates can be defined for different channel plans on different ds-rf-ports.

Conceptually, a ds-rf-port template represents an "operator default" configuration for a ds-rf-port. When there is no referenced template, the port reverts to the "factory default" configuration for a ds-rf-port, which is administratively shut down with no down-channels configured.

You should define at least one ds-rf-port template that generically configures the channel plan for a connected ds-rf-port, with a format similar to the following:



```
cable template ds-rf-port ds-default
  admin-state up
  base-channel-power-dbmv 40.0
  power-width-mhz 6
  max-occupied-bw-mhz 576.0
  tilt-adjust 2.0
  down-channel 0
    admin-state up
    ds-phy-profile 0
    frequency 555.000
  down-channel 1
    admin-state up
    ds-phy-profile 0
    frequency 561.000
```

Example

This is an example of a ds-rf-port template:

```
cable template ds-rf-port ds-tmpl
 admin-state             up
 base-channel-power-dbmv 33.3
 down-channel 0
  admin-state           up
  docsis-phy-profile    1
  frequency-mhz         123.0
  provisioned-attr-mask bonded,low-latency
  qam-alias             qam-0
 !
 down-channel 1
  admin-state           up
  docsis-phy-profile    1
  frequency-mhz         129.0
  provisioned-attr-mask bonded,low-latency
  qam-alias             qam-1
 !
 down-channel 2
  admin-state           up
  docsis-phy-profile    1
  frequency-mhz         135.0
  provisioned-attr-mask bonded,low-latency
  qam-alias             qam-2
 !
 down-channel 3
  admin-state           up
  docsis-phy-profile    1
  frequency-mhz         141.0
  provisioned-attr-mask bonded,low-latency
  qam-alias             qam-3
 !
 down-channel 4
  admin-state           up
  docsis-phy-profile    1
  frequency-mhz         147.0
  provisioned-attr-mask bonded,low-latency
  qam-alias             qam-4
 !
 ofdm-channel 0
  admin-state            up
  rf-mute                disabled
  power-adjust-db        0.0
  lower-bdry-freq-mhz    704.0
  upper-bdry-freq-mhz    896.0
  plc-blk-freq-mhz       797.0
  cyclic-prefix          256
  rolloff-period         128
  time-interleaver-depth 16
  subcarrier-spacing     50khz
  pilot-scale-factor     48
  lower-guard-band-index 1
  upper-guard-band-index 2
  test-mode              auto
  query-period-sec       100
  query-load-percent     0.1
  default-profile        A
  ofdm-profile A
   default-modulation qam1024
   threshold          0.0
   hysteresis         1.0
  !
  ofdm-profile B
   default-modulation qam4096
   threshold          0.0
   hysteresis         1.0
  !
  ofdm-profile NCP
   default-modulation qam16
   threshold          0.0
   hysteresis         1.0
  !
 !
 ofdm-channel 1
  admin-state            up
  rf-mute                disabled
  power-adjust-db        0.0
  lower-bdry-freq-mhz    407.0
  upper-bdry-freq-mhz    599.0
  plc-blk-freq-mhz       500.0
  cyclic-prefix          256
  rolloff-period         128
  time-interleaver-depth 16
  subcarrier-spacing     50khz
  pilot-scale-factor     48
  lower-guard-band-index 1
  upper-guard-band-index 2
  test-mode              auto
  query-period-sec       100
  query-load-percent     0.1
  default-profile        A
  ofdm-profile A
   default-modulation qam1024
   threshold          0.0
   hysteresis         1.0
  !
  ofdm-profile B
```

```
    default-modulation qam4096
    threshold          0.0
    hysteresis         1.0
   !
   ofdm-profile NCP
    default-modulation qam16
    threshold          0.0
    hysteresis         1.0
   !
  !
  leakage-signal 1
   signal-type      arcom
   center-frequency 500000000
   code             1
   power-adjust     1.0
  !
 !
```

Related information

cable ds-rf-port

cable ds-rf-port * channel-power-reference-width

cable template ds-rf-port * down-channel

See *cable ds-rf-port * down-channel*.

cable template mac-domain

Use the template form cable template mac-domain to enter the global mac-domain configuration mode. Use the **no** form of this command to delete a mac-domain template.

`cable template mac-domain` *md-template*
`cable no template mac-domain` *md-template*

The system enters the specified mac- domain template prompt:

`md-template` *md-template*

The mac-domain configuration commands in the mac-domain template are the same as those for individual mac-domain configuration, as described in *cable mac-domain*.

Syntax description

md-template	<string: 1...15> The created alphanumeric md-template starting with a letter. Up to four templates can be configured.

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

The CableOS Core supports the configuration of up to four mac-domain templates.

The **template mac-domain** configuration mode has the following sub-configuration modes:

- **privacy**: Enters **mac-domain privacy** sub-configuration mode with the prompt:
  - **(md-template md-template privacy)#**
- **ds-bonding-group**: Enters **mac-domain ds-bonding-group** sub-configuration mode with the prompt:
  - **(mac-domain slot/mac-domain-id dbg dbg-name)#**
- **us-bonding-group**: Enters **mac-domain us-bonding-group** sub-configuration mode with the prompt:
  - **(mac-domain slot/mac-domain-id ubg ubg-name)#**

Example

```
cable template mac-domain md-tmpl
 ds-primary-set            0,4,8,12,16,20
 ds-non-primary-set        1-3,5-7,9-11,13-15,17-19,21-23
 us-phy-channel-set        0-7
 admin-state               up
 bundle                    1
 eae                       ranging
 invited-ranging-attempts 1
 ip-provisioning-mode      dual-stack
 map-advance static
 map-advance extra-usec 100
 mdf                       enabled
 privacy accept-self-signed-certificate disabled
 privacy auth-lifetime-secs      0
 privacy skip-ca-cert            disabled
 privacy skip-cm-cert            disabled
 privacy skip-validity-period    disabled
 privacy tek-lifetime-secs       0
 source-verify             disabled
 sync-interval-msec        1
 tftp-proxy                enabled
 ucd-interval-msec         1
 up-down-trap              enabled
 us-frequency-range        extended
 no shared-secret
 ds-ofdm-set               0-1
 ds-bonding-group D16A
  admin-state             up
  down-channel-set        0-15
  provisioned-attr-mask   bonded
  resequencing-wait-msec 0.1
  warning-threshold-msec 0.1
 !
 ds-bonding-group D24A
  admin-state             up
  down-channel-set        0-23
  provisioned-attr-mask   bonded
  resequencing-wait-msec 0.1
  warning-threshold-msec 0.1
 !
 ds-bonding-group D24B
```

```
   admin-state            up
   down-channel-set       0-23
   provisioned-attr-mask  bonded
   resequencing-wait-msec 0.1
   warning-threshold-msec 0.1
   ofdm-channel-set       0-1
  !
  us-bonding-group U4A
   admin-state           up
   us-channel-set        0-3.0
   provisioned-attr-mask bonded
  !
  us-bonding-group U4B
   admin-state           up
   us-channel-set        4-7.0
   provisioned-attr-mask bonded
  !
  us-bonding-group U8A
   admin-state           up
   us-channel-set        0-7.0
  !
 !
```

Related information

cable mac-domain

cable template rpd

Use the `cable template rpd` command to configure a named template of attributes expanded for a Remote Phy Device (RPD).

`cable template rpd` *rpd-template-name* `admin-state  up |  down }  rf-port downstream` *num-ds-rf* `rf-port upstream` *num-us-rf* `ds-rf-port-template` *ds-template-name* `us-rf-port-template` *us-template-name* `domain` *d* `md-template` *mac-domain-template*

To remove an RPD template,

`no cable template rpd` *rpd-template-name*

Syntax description

rpd-template-name	Mandatory, 1..12 alphanumeric characters Identifies the RPD template. A uniquely named RPD is required for each physical combination of num-us-rf and num-ds-rf RF ports, for example, one for the 12-ds, 12-us "80G12" line card of an NSG PRO and one for the 1-ds, 2-us "EXO-R" remote phy device.
`admin-state`	Mandatory, enumerated { up | down } The default administratve state of RPDs expanded from this template. An RPD must be in admin-state up in order to operate DOCSIS MAC domains, but an RPD may still be configured and permitted to be attached to the CableOS Core while in admin-state down.

`domain`	Mandatory integer *d* (for "domain") which must be 0 for the current release. Identifies a MAC domain on each ds-rf-port of the RPD. Currently, CableOS Core supports a single MAC domain per ds-rf-port, so the domain-id *d* must be 0. For each cable ds-rf-port *vc:vs/pp* expanded for cable rpd *vc:vs*, the CableOS Core automatically expands the configuration of cable MAC domain *vc:vs/pp.d*.
`ds-rf-port-template`	Mandatory string ds-template-name of 1..15 characters. Name of the ds-rf-port template referenced by each ds-rf-port expanded for an RPD. The ds-template-name must already be configured as cable template ds-rf-port *ds-template-name*.
`md-template`	Mandatory string md-template-name of 1..15 characters Name of the MAC domain template referenced by each MAC domain expanded for the RPD. For each cable MAC domain *vc:vs/pp.d* expanded for an RPD, the CableOS Core automatically expands the reference cable MAC domain *vc:vs/pp.d* template *md-template-name*.
`rf-port downstream`	Mandatory integer *num-ds-rf* range 1..12. When committing cable rpd *vc:vs* template *rpd-template-name*, the CableOS Core automatically expands the configuration for cable ds-rf-port *vc:vs/pp* for each port *pp* in the range 0 to num-ds-rf.
`rf-port upstream`	Mandatory integer *num-us-rf* range 1..12, which must be either the same as *num-ds-rf* or twice the number of *num-ds-rf*. When committing cable rpd *vc:vs* template *rpd-template-name*, the CableOS Core automatically expands the configuration for cable us-rf-port *vc:vs/pp* for each port *pp* in the range 0 to num-us-rf.
`us-rf-port-template`	Mandatory string us-template-name of 1..15 characters. Name of the us-rf-port template referenced by each us-rf-port expanded for an RPD. The us-template-name must already be configured as cable template us-rf-port *ds-template-name*.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

Upon committing the configuration "cable rpd vc:vs template md-template-name", the CableOS Core automatically generates configuration by expanding the templates referenced by the RPD template, as explained above. In addition, the CableOS Core automatically expands configuration for fiber-nodes depending on whether the number of upstream ports num-us-rf is 1x or 2x the number of downstream ports num-ds-rf in the template. If num-us-rf is the same as num-ds-rf, the CableOS Core expands configuration for a fiber-node reached by one corresponding downstream and upsteam RF port of the RPD. That is, for each port pp from 0 to num-us-rf - 1, the CableOS Core automatically configures:

```
 cable fiber-node fn_vc:vs/pp
 ds-rf-port vc:vs/pp
 us-rf-port vc:vs/pp
```

If the number of upstream rf ports num-us-rf is twice the number of downstream ports num-ds-rf, then for every downstream port dd expanded for the RPD, the CableOS Core automatically configures two fiber nodes as:

```
 cable fiber-node fn_vc:vs/(2*dd)
 ds-rf-port vc:vs/dd
 us-rf-port vc:vs/(2*dd)
 cable fiber-node fn_vc:vs/(2*dd+1)
 ds-rf-port vc:vs/dd
 us-rf-port vc:vs/(2*dd+1)
```

Example

This is an example of an rpd template:

```
cable template rpd rpt-tmpl
 admin-state    up
 ds-rf-template ds-tmpl
 us-rf-template us-tmpl
 rf-ports downstream 1
 rf-ports upstream 1
 domain 0
  template md-tmpl
 !
!
```

Related information

cable rpd

cable template us-rf-port

Use the `cable template-us-rf-port` command to define a common template of parameters and channels for a cable us-rf-port interface. To delete a us-rf-template that is no longer referenced, use the **no** form of this command.

`cable template us-rf-port` *us-template*
`no cable template us-rf-port` *us-template*

After entering the `cable template-us-rf-port` command, you can then enter the following additional parameters:

Syntax description

us-template	<string:1...15> The name of the template; up to 15 alphanumeric characters starting with a letter. Up to four us-rf-port templates are supported.
`admin-state`	<enum: up | down> Default down. The long-term administrative state of the RF port interface, corresponding to the **adminStatus** SNMP object for the RF port interface. This attribute must be set to **up** for proper operation. When this attribute is set to **down**, the CCAP Core: • discontinues use of the port and all of its us-phy-channels • continues to support configuration of us-rf-port attributes and us-phy-channels • sets the SNMP **operStatus** for the RF port and us-phy-channel and us-logical channel interfaces to **down**
`plant-length-km`	<integer: 1...150> Default 150 Maximum one-way distance in kilometers to the most distant cable modem. The default value is for the maximum supported plant length for DOCSIS. The CableOS Core uses this value when calculating the duration of initial maintenance intervals and the map advance time. Reducing this parameter reduces initial maintenance overhead and can improve single-modem upstream performance when **cable mac-domain map-advance static** is configured. However, reducing this parameter lower than the actual plant length can result in distant CM initial-ranging failures and upstream data-transmission failures. When a MAC domain has more than one us-rf-port, the CableOS Core uses the largest value of plant-length-km configured for the ports.
`power-adjust`	Sets the power-adjustment methods on the CableOS Core to **Continue** or **Success**. See *cable us-rf-port * power-adjust*

us-phy-channel *channel-index*	<integer: 0...5> for max-carriers configured to 6 <integer: 0...11> for max-carriers configured to12 Enter cable us-rf-port * us-phy-channel sub-configuration mode to configure an upstream physical channel at a center frequency on the port. The COS CORE supports the configuration of up to eight us-phy-channels per us-rf-port on an 80G12 or Pebble.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Exec mode.

Usage guidelines

See the descriptions in the Syntax description for usage guidelines.

Example

This is an example of a us-rf-port template:

```
cable template us-rf-port us-tmpl
 admin-state up
 us-phy-channel 0
  admin-state    up
  frequency-mhz  20.0
  power-level-db 0.0
  width-mhz      6.400
  us-logical-channel 0
   admin-state        up
   docsis-channel-id  0
   ingress-cancellation disabled
   ingress-cancellation interval-msec 100
   modulation-profile 1
   pre-equalization enabled scale-exp 0
   slot-size          2
   transmit-backoff 2 6
   us-channel-type    atdma
   ranging-backoff 3 8
  !
 !
 us-phy-channel 1
  admin-state    up
  frequency-mhz  26.4
  power-level-db 0.0
  width-mhz      6.400
  us-logical-channel 0
   admin-state        up
   docsis-channel-id  0
   ingress-cancellation disabled
   ingress-cancellation interval-msec 100
   modulation-profile 1
   pre-equalization enabled scale-exp 0
   slot-size          2
   transmit-backoff 2 6
```

```
    us-channel-type    atdma
    ranging-backoff 3 8
   !
  !
  us-phy-channel 2
   admin-state    up
   frequency-mhz  32.8
   power-level-db 0.0
   width-mhz      6.400
   us-logical-channel 0
    admin-state        up
    docsis-channel-id  0
    ingress-cancellation disabled
    ingress-cancellation interval-msec 100
    modulation-profile 1
    pre-equalization enabled scale-exp 0
    slot-size          2
    transmit-backoff 2 6
    us-channel-type    atdma
    ranging-backoff 3 8
   !
  !
  us-phy-channel 3
   admin-state    up
   frequency-mhz  39.2
   power-level-db 0.0
   width-mhz      6.400
   us-logical-channel 0
    admin-state        up
    docsis-channel-id  0
    ingress-cancellation disabled
    ingress-cancellation interval-msec 100
    modulation-profile 1
    pre-equalization enabled scale-exp 0
    slot-size          2
    transmit-backoff 2 6
    us-channel-type    atdma
    ranging-backoff 3 8
   !
  !
  us-phy-channel 4
   admin-state    up
   frequency-mhz  45.6
   power-level-db 0.0
   width-mhz      6.400
   us-logical-channel 0
    admin-state        up
    docsis-channel-id  0
    ingress-cancellation disabled
    ingress-cancellation interval-msec 100
    modulation-profile 1
    pre-equalization enabled scale-exp 0
    slot-size          2
    transmit-backoff 2 6
    us-channel-type    atdma
    ranging-backoff 3 8
   !
  !
  us-phy-channel 5
   admin-state    up
   frequency-mhz  52.0
   power-level-db 0.0
   width-mhz      6.400
   us-logical-channel 0
    admin-state        up
    docsis-channel-id  0
    ingress-cancellation disabled
    ingress-cancellation interval-msec 100
    modulation-profile 1
    pre-equalization enabled scale-exp 0
    slot-size          2
    transmit-backoff 2 6
    us-channel-type    atdma
    ranging-backoff 3 8
   !
  !
  us-phy-channel 6
   admin-state    up
   frequency-mhz  58.4
   power-level-db 0.0
   width-mhz      6.400
   us-logical-channel 0
    admin-state        up
    docsis-channel-id  0
    ingress-cancellation disabled
    ingress-cancellation interval-msec 100
    modulation-profile 1
    pre-equalization enabled scale-exp 0
    slot-size          2
    transmit-backoff 2 6
    us-channel-type    atdma
    ranging-backoff 3 8
   !
  !
  us-phy-channel 7
   admin-state    up
   frequency-mhz  64.8
   power-level-db 0.0
   width-mhz      6.400
   us-logical-channel 0
    admin-state        up
    docsis-channel-id  0
    ingress-cancellation disabled
    ingress-cancellation interval-msec 100
    modulation-profile 1
    pre-equalization enabled scale-exp 0
    slot-size          2
    transmit-backoff 2 6
    us-channel-type    atdma
    ranging-backoff 3 8
   !
  !
 !
```

Related information

cable us-rf-port

cable unjoined-multicast

Use the `cable unjoined-multicast` command to enable flooding of unjoined multicast traffic to all primary capable DS channels on the system (on all MAC-Domains).

`cable unjoined-multicast` { `policy` *flood* | *drop* } { `vlan` *any* | *vlan-id* }

To revert to the default values of the keywords, enter:

```
no cable unjoined-multicast }
```

Syntax description

`policy` *flood*	Replicate all multicast traffic which does not match any existing rule to all primary capable channels.
`policy` *drop*	Drop all multicast traffic which does not match any existing rule. This is the default value.
`vlan` *any*	If the policy is set to *flood*, replicate no matter from which VLAN the traffic has been received. This is the default value.
`vlan` *vlan-id*	If policy is set to *flood*, replicate only if the traffic was received from the VLAN matching the configured value. Otherwise, drop the traffic. The vlan id is numeric and must be in the range 1 - 4095. **NOTE:** The VLAN can not be a DSI or L2VPN VLAN.

Default

This command has no default value.

Command mode

Config mode

Usage Guidelines

If you do not use this command, the system defaults will stay in place (`policy` is **drop** and `vlan` is **any**).This command should be used only after consultation with Harmonic technical support staff.

NOTE: Multicasts are replicated twice: – once with DSID for DOCSIS 3.x CMs (MDF enabled), and a second replication as broadcast for pre-DOCSIS 3.0 CMs (MDF incapable).

Examples

The example below defines that only traffic received from vlan 2341 will be replicated

```
cable unjoined-multicast policy flood vlan 2341
```

cable us-channel-admission-control-profile

Use the `cable us-channel-admission-control-profile` command to create a named profile containing upstream bandwidth thresholds for Data, Voice, and Voice Emergency.

`cable us-channel-admission-control-profile` [*profile-name* | *default*] [`class` { *US QoS class name* }] [`reserved-bandwidth` { *exclusive percent percentage* | *unlimited* }]

Syntax description

profile-name	US channel admission control profile can have any name.
US QoS class name	US class *names* are: • `UsReserved` • `UsVoice` • `UsVoiceEm` Where: • `UsReserved` = data • `UsVoice` = voice • `UsVoiceEm` = voice emergency
`exclusive percent` *`percentage`*	`exclusive percent`: Keyword. *percentage*: The percentage, `0-80`, of reserved exclusive bandwidth allocated to the `US QoS class`.
`unlimited`	Argument - allocates unlimited exclusive bandwidth to the `US QoS class`.

Default

A profile with the name *default* contains the following upstream bandwidth thresholds for the following QoS classes:

- `UsReserved` - unlimited
- `UsVoice` - 40%
- `UsVoiceEm` - 10%

A user may edit the profile named `default` in order to modify the default settings. The default profile will be used by channels that are not configured with a specific profile.

Command mode

Exec mode.

Usage guidelines

An unconfigured QoS class is assumed to be set to `unlimited`.

The total bandwidth reserved for all QoS classes cannot exceed 80% of the total channel bandwidth.

`us-channel-admission-control-profile` is applied per channel under RF port.

Examples

The following is an example of configuring an upstream channel admission control profile:

```
cable us-channel-admission-control-profile test_1
class UsReserved reserved-bandwidth exclusive percent 5
class UsVoice reserved-bandwidth exclusive percent 6
class UsVoiceEm reserved-bandwidth exclusive percent 8
Commit
```

The following is an example of upstream channel admission control profile settings:

```
show running-config cable us-channel-admission-control-profile
cable us-channel-admission-control-profile test_1
 class UsReserved
  reserved-bandwidth exclusive percent 5
 !
 class UsVoice
  reserved-bandwidth exclusive percent 6
 !
 class UsVoiceEm
  reserved-bandwidth exclusive percent 8
 !
cable us-channel-admission-control-profile test_2
 class UsReserved
  reserved-bandwidth exclusive percent 15
 !
 class UsVoice
  reserved-bandwidth exclusive percent 16
 !
 class UsVoiceEm
  reserved-bandwidth exclusive percent 18
 !
```

Related information

cable us-rf-port * ofdma-channel * us-channel-admission-control-profile

cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile

cable us-rf-port

Use the `cable us-rf-port` command to configure an individual us-rf-port. To restore the us-rf-port to its initial configuration of no template, admin-state down, use the **no** form of this command.

The commands for COS Core configuration are:

`cable us-rf-port` *vchassis* `vslot/`*usport*
`no cable us-rf-port` *vchassis* `vslot/`*usport*

The commands for NSG Pro configuration are:

`cable us-rf-port` *vss:pp* `no cable us-rf-port` *vss:pp*

After you have defined the port, you can then configure it by referencing a us-rf-port template. You can also, if necessary, override specific template parameters. For further details, see the *cable template us-rf-port* command.

Syntax description

vchassis	<integer: 1...255> The chassis index number
vslot (vss)	<integer:0...5,8...13> 80G12 (DULC) cardslot number <integer: 0...254> Pebble slot number
usport (pp)	<integer:0...5> port number on the 80G12 card
[template *us-template]*	Reference a **template us-rf-port** *us-template* that defines the default values for show running-config for this us-rf-port. By convention, removing and re-adding the template reference sets the attributes of this us-rf-port to the referenced template values
`[us-phy-channel` *channel-index*]	<integer: 0...5> for max-carriers configured to 6 <integer: 0...11> for max-carriers configured to12 Enter a sub-configuration mode to define the us-physical-channels of the us-rf-port. The COS CORE supports the configuration of up to eight us-phy-channels per us-rf-port on an 80G12 or Pebble. Use this to override any settings set in the referenced us-rf-port template (*cable template us-rf-port*)

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

The independent up-channel configurations of the COS Core and the NSG Pro may lead to different up-channel numbers for the same upstream frequency. A channel configuration conflict exists when both sides configure channels that overlap (either fully or partially) on an upstream channel frequency. Care should be taken to have the NSG-Pro and COS Core configure the same frequencies for the same channel number; this is not enforced automatically.

Example

The following example defines the us-rf-port for port 0 of slot 9 on chassis 1 (COS Core configuration):

```
cable us-rf-port 1:9/0
```

Related information

cable template us-rf-port

cable us-rf-port base-target-rx-power-dbmv

Use the `cable us-rf-port base-target-rx-power-dbmv` command to configure the base power ona US port (TLV 98.3).

`cable us-rf-port` *vc:vs/p* `base-target-rx-power-dbmv` *dbmv*

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
p	Specifies the port number
dbmv	The base power for the port. The default value is 0.0 and the valid range is -20 .. 40.

Default

The default base power for the US port is 0.0 dBmV

Command mode

Config mode.

Usage guidelines

There are no additional guidelines for this command.

Examples

The example below sets the base power on US RF port 0 on slot 0, chassis 2 to 2.0 dBmV:

```
cable us-rf-port 2:0/0 base-target-rx-power-dbmv 2.0
```

Related information

cable rpd use-base-target-rx-power

cable us-rf-port ofdma-channel

Use the `cable us-rf-port ofdma-channel` command to configure an OFDMA upstream channel. To delete an OFDMA upstream channel, use the **no** form of this command.

`cable us-rf-port` *vc:vs/p* [`ofdma-exclusion-block-mhz` *excluded-lower excluded-upper*] `ofdma-channel` *ofdma-chan-index* `admin-state` *admin-state* `frequency-range-mhz` *lower-boundary upper-boundary* [`initial-ranging frequency-mhz` *ir-freq*] [`fine-ranging frequency-mhz` *fr-freq*] [`provisioned-attr-mask` *provisioned-attr-mask*] `ranging-backoff` *start-exp end-exp* `transmit-backoff` *start-exp end-exp* `target-power-density` *target-power-density* [`cm-initial-power` *control* `density` *initial-ranging-power-density* `step` *initial-ranging-power-step*] `modulation-profile` *mod-profile-ofdma-index* [`data-iuc` *iuc* { `band-mhz` *lower-freq-mhz upper-freq-mhz* `modulation` *ofdma-mod-type* `pilot-pattern` *pilot-pattern* }

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
p	Specifies the Port number
admin-state	Administrative state of the OFDMA channel.

`ofdma-exclusion-block-mhz excluded-lower excluded-upper`	Configures cable-us-rf-port to exclude blocks of frequencies for assignment to OFDMA channels on the port. OFDMA channels are configured in a range between boundary frequencies. This configuration instructs OFDMA channels on the port to exclude blocks of frequency within its range for other upstream transmission purposes on the plant, including for overlapping SCQAM us-phy-channels. DOCSIS prevents all upstream OFDMA transmission in an exclusion range. The *excluded-lower* parameter is the lower edge of the exclusion range expressed in MHz with a granularity of 0.001 MHz and must be in the range: 5.000 - 197.600 The *extended-upper* parameter is the upper edge of the exclusion range expressed in MHz with a granularity of 0.001 MHz and must be in the range: 11.400 - 204.000 The CMTS validates the following constraints before committing changes to excluded-lower or excluded-upper: • The *excluded-upper* frequency exceeds the *excluded-lower* frequency • The excluded frequencies lie completely within the configured channel boundaries The configured values of *excluded-lower* and *excluded-upper* need not coincide with the edge of a sub-carrier. The CMTS automatically excludes any sub-carrier that overlaps an excluded frequency range. An "active" sub-carrier of an OFDMA channel is defined as one that lies completely within the configured boundary range (less guard bands) and is not excluded. An "active data sub-carrier" is one that is assigned to a mini-slot for data passing. Some active sub-carriers may not be able to be assigned to a mini-slot due to the requirement for a mini-slot to have a minimum number of consecutively numbered sub-carriers; such sub-carriers are called "unused sub-carriers". The CMTS automatically determines which active sub-carriers are "unused" for mini-slots and informs CMs of them in a UCD message. Unused sub-carriers still participate in PNM probes.
ofdma-chan-index	Identifies an OFDMA channel on the us-rf-port. Valid entries are either 0 or 1.

`frequency-range-mhz`*lower-boundary upper-boundary*	Configures the frequency range of the OFDMA channel. The lower-boundary parameter is the lower edge expressed in MHz with a granularity of 0.001 MHz and must be in the range: 5.000 - 197.600 The upper-boundary parameter is the upper edge expressed in MHz with a granularity of 0.001 MHz and must be in the range: 11.400 - 204.000 The CMTS validates the following constraints before committing changes to the lower-boundary or upper-boundary parameters: • The *upper-boundary* exceeds the *lower-boundary* • The channel width (*upper-boundary* minus *lower-boundary*) does not exceed 96.0 MHz • The channel width is no less than 10.0 MHz for 25kHz sub-carrier spacing or 6.4 MHz for 50kHz sub-carrier spacing • The frequency range does not overlap with any other OFDMA or non-OFDMA upstream channel on the same port. This is enforced even when the overlapping channels have "admin-state down". The configured values of lower-boundary and upper-boundary need not coincide with the edge of a sub-carrier. The CMTS automatically excludes sub-carriers with any frequency outside of the configured frequency band with a fixed guard band of 0.5 MHz at each end.

`initial-ranging frequency-mhz` *ir-freq* `fine-ranging frequency-mhz` *fr-freq*	Configures the lower boundary frequency of the initial/fine ranging zone (IUC3 / IUC4). These fields are optional: if they are not specified, an implementation-defined algorithm will automatically choose the frequency of the ranging zones. The freq parameters are the lower edge of the ranging zone, expressed in MHz with a granularity of 0.001 MHz. The ranging zone must always start at the minislot boundary, thus the configured frequency-mhz will be rounded down to the nearest minislot boundary (the minislot size is 400 KHz regardless of spacing. The configured frequency-mhz must be located within the frequency range defined by frequency-range-mhz and obey the rules of the DOCSIS CM-SP-PHYv3.1 specification. If the user configured an invalid value, CLI validation will reject the commit and provide an message with possible valid ranges: `Aborted: 'cable us-rf-port 1:10/1': ofdma-channel: 0, configuration error: non-valid Ofdma parameters:` **`Specified Initial Ranging frequency 50.000 MHz is invalid.`** **`List of valid frequency bands: [ 40.200 .. 49.800 ] MHz [ 60.050 .. 74.850 ] MHz [ 76.050 .. 100.850 ] MHz`**
`provisioned-attr-mask`	A comma-separated list of bit names used to construct a 32-bit provisioned attribute mask for the channel. Service flows can be configured to require or forbid individual attributes, which affect their assignment to the OFDMA channel or a us-bonding-group that includes the channel. The available bit names are: • bonded • high-availability • low-latency • reserved-3 reserved-4 reserved-5 reserved-6 reserved-7 reserved-8 reserved-9 reserved-10 reserved-11 reserved-12 reserved-13 reserved-14 reserved-15 • operator-16 operator-17 operator-18 operator-19 operator-20 operator-21 operator-22 operator-23 operator-24 operator-25 operator-26 operator-27 operator-28 operator-29 operator-30 operator-31

`ranging-backoff start-exp end-exp`	Configures the starting and ending binary exponents for ranging back-off. Both *start-exp* and *end-exp* must be in the range 0 - 16, and *end-exp* must be larger than *start-exp*.
`transmit-backoff start-exp end-exp`	Configures the starting and ending binary exponents for transmission back-off. Both *start-exp* and *end-exp* must be in the range 0 - 16, and *end-exp* must be larger than *start-exp*.
`target-power-density target-power-density`	Target upstream received power density in units of dBmV per 1.6 MHz of active sub-carrier bandwidth, configured as a signed, fixed decimal point with a granularity of 0.1 dBmV. When an RPD is unattached, the CMTS limits the range of target-power-density configuration to: -13.0 to +19.0 dBmV/1.6 MHz When an RPD is attached, the CMTS validates that any change to the target-power-density is within the range of the RPD's actual capabilities as reported by the GCP "MinBaseUsPowerTargetLevel" (TLV 50.49.1) and "MaxBaseUsPowerTargetLevel" (TLV 50.49.2). When an RPD attaches and has a configured target-power-density outside of its capability range, the CMTS rejects the RPD attachment and reports that the RPD has a "mismatched" configuration. It raises a MAJOR alarm and logs a CRITICAL severity event. The configuration must be changed to match the RPD capabilities in order to successfully attach the RPD.

`cm-initial-power control`
`density cm-initial-power-density`
`step cm-initial-power-step`
	The control parameter is either enabled or disabled and controls whether the CMTS sends the "OFDM IR Power Control" TLV 22 within the Type 23 OFDMA Burst Descriptor of a Type 51 UCD message for OFDMA. This TLV instructs CMs how to set their transmission power in OFDMA broadcast initial ranging intervals.
	The cm-initial-power-density sets the CM's starting power density. It is expressed in the CLI as a fixed point number in units of dBmV per 1.6 MHz, with a granularity of 0.25. The cm-initial-power-step sets the increase in power density when the CM repeats an initial ranging request. It is also expressed as a fixed point decimal number in units of dBmV per 1.6 MHz with a granularity of 0.25. The permitted configuration ranges are:
	cm-initial-power-density: 17.00 to 53.00 dBmV/1.6 MHz

`modulation-profile mod-profile-ofdma-index`	References mod-prof-ofdma.
`data-iuc ofdma-iuc`	Starts configuration of a list of "override" mini-slot modulations for one particular interval usage code (IUC). The ofdma-iuc value must be one of the following: • 5 • 6 • 9 • 10 • 11 • 12 • 13 A data IUC may have multiple "band-mhz" configurations that override the default configuration in the OFDMA modulation profile for the indicated IUC.
`band-mhz lower-freq upper-freq`	Specifies the OFDMA modulation for the active data sub-carriers within a sub-range of the OFDMA frequency boundaries. The lower-freq parameter is the lower edge of the sub-range expressed in MHz with a granularity of 0.001 MHz and must be in the range 5.000 - 204.000 The upper-freq parameter is the upper edge of the sub-range expressed in MHz with a granularity of 0.001 MHz and must be in the range 5.000 - 204.000 The values of lower-freq and upper-freq need not be on sub-carrier or mini-slot edges, and may overlap excluded frequency ranges. The range must be within the frequency-range-mhz for the channel. The CMTS applies the override to any mini-slot that overlaps the band-mhz sub-range. If a mini-slot overlaps more than one band-mhz range, the CMTS selects the band-mhz with the lower frequency band for the mini-slot. The frequency ranges of mini-slots can be observed using the `show cable us-rf-port * ofdm-channel` command. The CMTS validates that: • The upper-freq is higher than lower-freq by at least one sub-carrier width. • No band-mhz sub-ranges of the same data-iuc list overlap

`modulation ofdma-mod-type`	The ofdma-mod-type must be one of the following values: • BPSK • QPSK • 8-QAM • 32-QAM • 64-QAM • 128-QAM • 1024-QAM • 2048-QAM • 4096-QAM
`pilot-pattern pilot-pattern`	The pilot-pattern selects a pilot pattern from the DOCSIS 3.1 PHY specification, and is in the range 1 - 14.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

OFDMA is based on performing FFT for a fixed 102.4 MHz block with either 2K or 4K samples, transmitting on sub-carriers that are spaced every 25 kHz or 50 kHz apart with a center frequency that is an even multiple of the sub-carrier spacing. The 102.4 MHz block is considered to be placed to surround the configured OFDMA channel bandwidth, with "excluded" carriers before and after the configured channel bandwidth. Per MULPI, sub-carriers are numbered from 0 - 2047 for 50 kHz sub-carriers and 0 - 4095 for 25 kHz sub-carriers. The Harmonic CMTS places the lower edge of the sub-carrier #0 at least 3.2 MHz before the configured lower-bdry-freq-mhz, and excludes that initial 3.2 MHz along with a 0.5 MHz guard band starting at the configured lower-bdry-freq-mhz. The CMTS then enables subsequent sub-carriers for data use until it reaches the upper-bdry-freq-mhz minus another 0.5 MHz guard band. For example, for a channel boundary of 40.000 to 80.000 MHz with 50 kHz sub-carrier spacing, the CMTS assigns 39.0 MHz to 780 sub-carriers numbered #74 to #853.

Example

Please refer to the User Guide for more information.

Related information

cable mac-domain * us-bonding-group *ofdma-channel-set
cable mod-prof-ofdma
cable us-rf-port ofdma-channel ofdma-prof-mgmt
show cable mod-prof-ofdma
show cable us-rf-port ofdma-channel
cable us-rf-port ofdma-channel nbnr

cable us-rf-port ofdma-channel ofdma-prof-mgmt

Use the `cable us-rf-port ofdma-channel ofdma-prof-mgmt` command to configure OFDMA dynamic profile modulation on the upstream channel.

`cable us-rf-port` *vc:vs/p* `ofdma-channel` *ofdma-chan-index* `control` { *enabled* | *disabled* } `ignored-mslot-pct` *ignored-mslot-pct* `mer-margin-db` *mer-margin-db* `mer-hysteresis-db` *mer-hysteresis-db* `mer-poll-interval-min` *mer-poll-interval-min* `unfit-period-minutes -min` *unfit-period-minutes* `corrected-fec-pct` *corrected-fec-pct* `uncorrected-fec-pct` *uncorrected-fec-pct* `min-codewords` *min-codewords* `no-data-energy-pct` *no-data-energy-pct* `min-bursts` *min-bursts* [`iuc13-backup` { *enabled* | *disabled* }]

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
p	Specifies the port number
ofdma-chan-index	Identifies an OFDMA channel on the us-rf-port. Valid entries are either 0 or 1.
`control`	Controls if OFDMA dynamic profile modulation change is enabled or disabled. The default value is disabled.
ignored-mslot-pct	The percentage of ignored minislots during data profile selection. Valid values are integers in the range 0 .. 100. The default value is 1.
mer-margin-db	The MER margin in decibels. Valid values are -6.0 .. 12.0. The default value is 0.0.
mer-hysteresis-db	The MER hysteresis in decibels. Valid values are 1.0 .. 6.0. The default value is 2.0
mer-poll-interval-min	The MER minimum polling interval in minutes. Valid values are 5 .. 1440. The default value is 5. **NOTE:** A value of 0 disables the NBNR feature.
unfit-period-minutes	How long the modulation profile will be unavailable for selection. The default value is 6 minutes.
corrected-fec-pct	The corrected FEC percentage. The default value is 50
uncorrected-fec-pct	The uncorrected FEC percentage. The default value is 1
unfit-period-minutes	How long the modulation profile will be unavailable for selection. The default value is 6 minutes.

min-codewords	Defines the minimum number of codewords needed for FEC statistics calculation for the profile selection. Valid values are integers in the range 10 .. 1000000. The default value is 100.
no-data-energy-pct	The threshold for the maximum percentage of no energy bursts from total bursts. Drop CM to partial when IUC13 is active and the no energy threshold is passed. Valid values are integers in the range 1 .. 100. The default value is 100 (meaning the feature is disabled)
min-bursts	Defines the minimum data bursts needed for no energy calculation Valid values are integers in the range 10 .. 1000000. The default value is 100.
`iuc13-backup`	Controls if IUC13 is used as a backup IUC. The default value is enabled.

Default

By default, OFDMA dynamic profile modulation is disabled.

Command mode

Config mode.

Usage guidelines

The CMTS can be defined with up to 7 IUCs per OFDMA channel (IUC 5,6 ,9,10,11,12,13), where IUC13 must be defined for a channel. IUC13 is used during CM registration, so should be configured with the most robust modulation (lower modulation order) out of the configured IUC list.

Dynamic OFDMA Profile Selection is performed on a per CM basis. The CMTS controller tracks the upstream receiver performance corresponding to each CM transmission and best fits an IUC from the configured list.

The criteria for selecting the best fitting modulation are as follows:

- For each defined IUC modulation profile, an ‘IUC profile excess dB’ is calculated. The lowest positive ‘IUC profile excess dB’ is considered as the best fit profile.
- If the currently selected IUC profile for a CM has a negative ‘IUC profile excess dB’, the IUC profile is considered FAIL.
- If the IUC profile is considered FAIL and the uncorrected FEC [%] is greater than the uncorrected FEC threshold [%], or the corrected FEC [%] is greater than the corrected FEC threshold [%], then switch to the best fit profile.
- If the currently selected IUC profile for a CM ‘IUC profile excess dB’ is greater than hysteresis [dB], the IUC profile is considered HYST_PASS.
- If the IUC profile is considered HYST_PASS and the uncorrected FEC [%] is lower than the uncorrected FEC threshold [%], and the corrected FEC [%] is lower than the corrected FEC threshold [%], then switch to the best fit profile.

The ‘IUC profile excess dB’ is calculated based on a predefined $MER_{threshold}$ per modulation-order biased by the configured *mer-margin-dB*.

The deployed predefined $MER_{threshold}$ per modulation-order is according to the defined performance thresholds in DOCSIS PHY3.1.

If the Dynamic OFDMA Profile Selection is enabled, the CM registers using IUC13 and then assigns and grants the best fit IUC profile from the defined list.

If the Dynamic OFDMA Profile Selection is disabled, the CM registers using IUC13 and then assigns and grants IUC12 if it exists in the list.

Example

Refer to the User Guide for more information.

Related information

cable us-rf-port ofdma-channel

show cable us-rf-port ofdma-channel

cable us-rf-port ofdma-channel power-adjust

Use the `cable us-rf-port ofdma-channel power-adjust` command to configure the power adjust an a US OFDMA channel (TLV 66.13).

`cable us-rf-port` *vc:vs/p* `ofdma-channel` *ofdma-chan-index* `power-adjust-db` *db*

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
p	Specifies the port number
ofdma-chan-index	Identifies an OFDMA channel on the us-rf-port. Valid entries are either 0 or 1.
db	The power adjust for the channel. The default value is 0.0 and the valid range is -40 .. 40.

Default

The default power adjust for the channel is 0.0 dB.

Command mode

Config mode

Usage guidelines

There are no additional guidelines for this command.

Examples

The example below sets the power adjust on OFDMA channel 0 on US RF port 0 on slot 0, chassis 2 to 2.0 dB:

```
cable us-rf-port 2:0/0 ofdma-channel 0 power-adjust-db 2.0
```

Related information

cable rpd use-base-target-rx-power

cable us-rf-port oob-channel

Use the `cable us-rf-port oob-channel` command to configure the SCTE-55-1 OOB ID.

`cable us-rf-port` *vc:vs/pp* `oob-channel` *oob-channel-id* `admin-state` `bandwidth-mhz` `ccap-core-owner` `dest-id` `frequency-mhz` `power-gain` `rf-mute` `type`

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
pp	Specifies the port number
oob-channel-id	Specifies the channel ID. The valid range is from 0 - 2
`admin-state`	The administrative state of the OOB channel. The default is **Up**
`bandwidth-mhz`	The bandwidth of the OOB channel
`ccap-core-owner`	The ccap-core-owner of the OOB channel
`dest-id`	The OOB destination ID
`frequency-mhz`	The OOB channel center frequency
`power-gain`	The power gain of the OOB channel in dB - NDF: [-50.0..25.0], NDR: [-20.0..30.0] (This value can be left at the default 0.0)
`rf-mute`	The rf-mute of the OOB channel. The default is **disabled**
`type`	The type of OOB channel
Additional fields when the OOB type is 55-1:	
	varpd-demod-id: Demodulator identifier of Advanced Return Path Demodulator
	varpd-device-id: Advanced Return Path Demodulator source identifier

	varpd-rf-port-id: RF port identifier of Advanced Return Path Demodulator

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

IMPORTANT: If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Examples

The following example defines channel 0 as the SCTE-55-1 channel ID for chassis 1, slot 1, port 1:

```
cable us-rf-port 1:1/1 oob-channel 0
```

Configuration examples:

```
a@CableOS> show running-config cable us-rf-port oob-channel
cable us-rf-port 1:0/0
oob-channel 0
  frequency-mhz 8.5
  bandwidth-mhz 2.56
  power-gain    10.0
  type          ndr
  dest-id       41
```

```
a@CableOS> show running-config cable us-rf-port oob-channel
cable us-rf-port 1:0/0
oob-channel 0
  frequency-mhz    8.092
  bandwidth-mhz    1.28
  type             55-1
  dest-id          123
  varpd-device-id  1
  varpd-rf-port-id 1
  varpd-demod-id   1
```

Related information

cable oob-dest id

cable oob-dest l2tp

cable oob-dest us-vc

cable us-rf-port us-oob-channel dest-id

cable us-rf-port us-oob-channel frequency-mhz

cable us-rf-port us-oob-channel type

cable us-rf-port us-oob-channel dest-id

Use the `cable us-rf-port oob-channel dest-id` command to configure the SCTE-55-1 OOB Video Core destination ID.

`cable us-rf-port` *vc:vs/pp* `oob-channel` *oob-channel-id* `oob-core-id` *core-id*

Syntax description

`vc`	Specifies the CableOS Virtual Chassis
`vs`	Specifies the CableOS Virtual Slot
`pp`	Specifies the port number
`oob-channel-id`	Specifies the channel ID. The valid range is from 0 - 2.
`dest-id`	Specifies the upstream OOB Video Core destination ID. The valid range is 0-255
`oob-dest-id type`	Specifies the oob-dest-id type. Valid values are 0..1

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

IMPORTANT: If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Example

The following example defines the destination core ID for chassis 1, slot 0, port 0, channel 0 as 9.

```
cable ds-rf-port 1:0/0 oob-channel 0 oob-core-id 9
```

Related information

cable oob-dest id

cable oob-dest l2tp

cable oob-dest us-vc

cable us-rf-port oob-channel

cable us-rf-port us-oob-channel frequency-mhz

cable us-rf-port us-oob-channel type

cable us-rf-port us-oob-channel frequency-mhz

Use the `cable us-rf-port us-oob-channel frequency-mhz` command to configure the upstream SCTE 55-1 OOB channel center frequency.

`cable us-rf-port` *vc:vs/pp* `us-oob-channel` *oob-channel-id* `frequency-mhz` *freq*

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
pp	Specifies the port number
oob-channel-id	Specifies the channel ID. The valid range is from 0 - 2.
freq	Specifies the Upstream center frequency for 55-1 channel. The RPD QPSK modulates the OOB stream and transmits it via RF at the appropriate frequency on the specified downstream RF ports.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

IMPORTANT: If the RPD is defined as an NDFR device, for any changes to this configuration to take effect, you MUST reboot the RPD.

Example

The following example defines the frequency for channel 0 of chassis 1, slot 0, port 0 as 91.5.

```
cable us-rf-port 1:0/0 us-oob-channel 0 frequency-mhz 91.5
```

Related information

cable oob-dest id

cable oob-dest l2tp

cable oob-dest us-vc

cable us-rf-port oob-channel

cable us-rf-port us-oob-channel dest-id

cable us-rf-port us-oob-channel type

cable us-rf-port oob-channel power-adjust

Use the `cable us-rf-port oob-channel power-adjust` command to configure the power adjust on a US oob channel (TLV 92.7 for 55-1 and TLV 95.5 for NDR).

`cable us-rf-port` *vc:vs/p* `oob-channel` *oob-channel-id* `power-adjust-db` *db*

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
p	Specifies the port number
oob-channel-id	Specifies the channel ID. The valid range is from 0 - 2.
db	The power adjust for the channel. The default value is 0.0 and the valid range is -40 .. 40.

Default

The default power adjust for the channel is 0.0 dB.

Command mode

Config mode

Usage guidelines

Currently, Harmonic RPDs do not support the configuring of US power level from the Core CLI for OOB channels.

Examples

The example below sets the power adjust on OOB channel 0 on US RF port 0 on slot 0, chassis 2 to 2.0 dB:

```
cable us-rf-port 2:0/0 oob-channel 0 power-adjust-db 0.0
```

cable us-rf-port us-oob-channel type

Use the `cable us-rf-port us-oob-channel type` command to define the type of OOB channel to be configured.

`cable us-rf-port` *vc:vs/pp* `us-oob-channel` *oob-channel-id* `type` *type*

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot

pp	Specifies the port number
oob-channel-id	Specifies the channel ID. The valid range is from 0 - 2.
type	Specifies the OOB type. The valid values are: • 55-1 (Arris/Motorola) • ndr
Additional fields when the OOB type is 55-1:	
	varpd-demod-id: Demodulator identifier of Advanced Return Path Demodulator
	varpd-device-id: Advanced Return Path Demodulator source identifier
	varpd-rf-port-id: RF port identifier of Advanced Return Path Demodulator

Default

The default channel type is 55-1 (Arris/Motorola)

Command mode

Config mode.

Usage guidelines

IMPORTANT: If changing the OOB type, you MUST reboot the RPD so that the updated type will take effect.

Examples

The following example defines channel 0 of chassis 1, slot 0, port 0 as being of type 55-1.

```
cable us-rf-port 1:0/0 us-oob-channel 0 type 55-1
```

Related information

cable oob-dest id

cable oob-dest l2tp

cable oob-dest us-vc

cable us-rf-port oob-channel

cable us-rf-port us-oob-channel dest-id

cable us-rf-port us-oob-channel frequency-mhz

cable us-rf-port us-oob-channel type

cable us-rf-port * ofdma-channel * us-channel-admission-control-profile

Use the `cable us-rf-port * ofdma-channel * us-logical-channel * us-channel-admission-control-profile` command to select a named profile to set the upstream bandwidth thresholds for Data, Voice, and Voice Emergency for a specific OFDMA upstream channel.

```
cable us-rf-port [VC | VS | P] ofdma-channel [chl] us-channel-admission-
control-profile [profile name]
```

Syntax description

VC/ VS/ P	Specifies the upstream port number.
chl	Specifies the OFDMA channel.
profile-name	Specifies the upstream OFDMA admission control profile name.

Default

A profile with the name *default* always exists and if a profile name is not specified in the CLI command this profile will be used.

Command mode

Exec mode.

Usage guidelines

The `us-channel-admission-control-profile` is applied per channel under RF port.

If the channel is in **TaFDM** mode, the user should not reserve more than 40% of the channel. This guideline is not automatically validated.

Examples

The following is an example of an upstream OFDMA modulation profile selection:

```
admin@CableOS(config)# cable us-rf-port 1:1/9 ofdma-channel 0 us-channel-admission-
control-profile us_profile
```

Related information

cable us-channel-admission-control-profile

cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile

cable us-rf-port * power-adjust

In either cable us-rf-port or cable template us-rf-port configuration mode, enter the following command to enter a sub-configuration mode to configure the power adjustment methods on the CableOS Core:

```
power-adjust { continue pwr-level  threshold value }
```

To revert to the default values for power-adjust, use the **no** form of the command in either cable us-rf-port or cable template us-rf-port configuration mode:

```
no power-adjust { continue  threshold }
```

Syntax description

continue pwr-level	<integer: 2...15 dB> Mandatory Default 4 dB Specifies the power threshold value that determines the value of the Ranging Status field in the Ranging Response (RNG-RSP) messages that the CMTS sends to the CM. When the power difference is below this value in dB the CMTS sends last RNG-RSP with status *success*. This last RNG-RSP may include a last correction value that is different than zero.
threshold value	<integer: 0...10 dB> Mandatory Default 1 dB Specifies the power adjustment threshold. During periodic ranging, if the power adjustment is below this value, the CMTS should send RNG-RSP with status success and zero adjustment. Only when the power adjustment exceeds this value should the CMTS respond with a correction value.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

The two threshold types, *continue* and *success*, are independent and can be configured in any combination.

IMPORTANT: For any changes to this configuration to take effect, you MUST reboot the RPD unless the RPD has already worked in I08 mode for US power adjustment.

cable us-rf-port * us-phy-channel

In either **cable us-rf-port** or **cable template us-rf-port** configuration mode, enter the following command to enter a sub-configuration mode to configure the us-physical-channels of the us-rf-port:

`us-phy-channel` *channel-index*

The CableOS Core supports the configuration of up to eight us-phy-channels per us-rf-port on an 80G12 or Pebble.

To delete a us-phy-channel, enter the following command in either **cable us-rf-port** or **cable template us-rf-port** configuration mode:

```
no us-phy-channel channel-index
```

Syntax description

`channel-index`	<integer: 0...5> for max-carriers configured to 6 <integer: 0...11> for max-carriers configured to 12
`[admin-state]`	<enum: up | down> Default down Administrative state of the us-phy-channel where **down** means that the channel has been turned off; **down** is the default state. Must be set to **up** for proper operation. When set to **down**, the CableOS Core does not use the channel, but permits it to be configured.

`frequency-mhz`	<hz: 5.000...85.000, step 0.001 MHz> Mandatory, 3 digits after decimal point. Configured center frequency of the upstream physical channel, in Hertz. As of DOCSIS 3.0, the minimum permitted value is the center frequency such that the lower channel edge is 5000000 Hz and the maximum permitted value is the center frequency at which the upper channel edge is 85000000 Hz. This attribute corresponds to the docsIfUpChannelFrequency object of DOCS-IF-MIB [RFC 4546]. The CableOS Core rejects any configuration that attempts to assign overlapping frequencies on operational us-phy-channels of the same us-rf-port. This includes changes to any of the following configurations: • **cable us-rf-port us-phy-channel \ frequency-mhz** • **cable us-rf-port us-phy-channel width-mhz** • **template us-rf-port** (which can force us-phy-channel configurations to the template value) • **cable us-rf-port us-phy-channel admin-state** (which can change a us-phy-channel to be operational) • **cable us-rf-port admin-state** (which can change multiple us-phy-channels on a us-rf-port to be operational **up**)
`[power-level-db]`	<signeddB range -13.0... 40.0 > Default 0.0 dBmV. Granularity 0.1 dB. Configures the desired input power level, in dB, common for all upstream logical channels associated with this physical channel instance. The power level for an individual logical channel can be deviated from the common power level through configuration of the **PowerLevelAdjust** attribute.
`width-mhz`	<integer: 0.200, 0.400, 0.800, 1.600, 3.200, 6.400> Mandatory Configures the width of the upstream-physical-channel, in MHz, with a granulation of 0.001 MHz. This attribute corresponds to the docsIfUpChannelFrequency object of DOCS-IF-MIB [RFC 4546] divided by 1000000. Harmonic highly recommends that when changing **width-mhz**, the slot-size parameter of the us-logical-channel template for all logical channels operating on this us-phy-channel be set to 32 symbol times. For example, for a channel-width of 6.4 MHz, which yields 5.12 Msymbols/s, there are 2 ticks of the 10.24 MHz master clock per symbol, so the slot-size should be set to 64 ticks.

`[up-down-trap]`	<enum: enabled | disabled> Default disabled Enables the **linkUp** and **linkDown** SNMP traps for this channel interface.
us-logical-channel *logical-index*	Enters us-logical-channel sub-configuration mode. At least one us-logical-channel must be defined on every us-phy-channel.

Default

See the descriptions in the *Syntax description* for default values.

Command mode

Config mode.

Usage guidelines

See the descriptions in the *Syntax description* for usage guidelines.

Example

```
config)#  cable template us-rf-port us-template
config-us-rf-port-template)#  us-phy-channel 0
us-rf-port vc:vs/p/channel-index)#
```

Related information

cable us-rf-port * us-phy-channel * us-logical-channel * ingress-cancellation
cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile
cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile threshold
cable us-rf-port * us-phy-channel * us-logical-channel * pre-equalization
cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile
cable rpd use-base-target-rx-power

cable us-rf-port us-phy-channel power-adjust-db

Use the `cable us-rf-port us-phy-channel power-adjust` command to configure the power adjust on a US QAM (TLV 65.9).

`cable us-rf-port` *vc:vs/p* `us-phy-channel` *channel-index* `power-adjust-db` *db*

Syntax description

vc	Specifies the CableOS Virtual Chassis
vs	Specifies the CableOS Virtual Slot
p	Specifies the port number

channel-index	<integer: 0...5> for max-carriers configured to 6 <integer: 0...11> for max-carriers configured to 12
db	The power adjust for the channel. The default value is 0.0 and the valid range is -40 .. 40.

Default

The default power adjust for the channel is 0.0 dB.

Command mode

Config mode

Usage guidelines

There are no additional guidelines for this command.

Examples

The example below sets the power adjust on the QAM channel 0 on US RF port 0 on slot 0, chassis 2 to 4.0 dB:

```
cable us-rf-port 2:0/0 us-phy-channel 0 power-adjust-db 4.0
```

Related information

cable rpd use-base-target-rx-power

cable us-rf-port * us-phy-channel * us-logical-channel * ingress-cancellation

Use the `cable us-rf-port * us-phy-channel * us-logical-channel * pre-equalization` command to define the Harmonic-proprietary ingress noise cancellation.

`cable us-rf-port` *VC_VS_ P* `us-phy-channel` *chl* `us-logical-channel` *ulog* `ingress-cancellation` [*control*] [`interval-msec` *msec*]

Syntax description

VC_VS_ P	Specifies the upstream port number.
ch1	Specifies the physical upstream channel.
ulog	Specifies the logical upstream channel number (always 0).
control	Enables or disables the ingress cancellation. The default is **disabled**.

msec	The duration in milliseconds of the time intervals evaluated by internal digital signalling processing. . The valid range is from 10 - 3000, with a default of 100.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

There are no Usage Guidelines for this command.

Related information

cable us-rf-port * us-phy-channel
cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile
cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile threshold
cable us-rf-port * us-phy-channel * us-logical-channel * pre-equalization
cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile

cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile

To assign up to three modulation-profiles to an upstream logical channel, use the `cable us-rf-port us-phy-channel us-logical-channel modulation-profile` command in cable interface configuration mode. To set the upstream modulation-profile to the single default profile based on the DOCSIS mode setting of the upstream, use the **no** form of this command and then assign the single modulation-profile (it is mandatory to have at least one modulation-profile).

```
cable us-rf-port VC/VS/P chl us-logical-channel ulog modulation-profile primary-modulation-profile [secondary secondary-modulation-profile] [tertiary tertiary-modulation-profile]
no us-rf-port VC/VS/P chl us-logical-channel 0 modulation-profile
```

Syntax description

VC/ VS/ P	Specifies the upstream port number.
chl	Specifies the upstream physical channel.
ulog	Specifies the upstream logical channel number (always 0).

primary-modulation-profile	(Mandatory) Specifies the number identifying the primary modulation-profile for the upstream logical channel. The primary modulation-profile is used when the channel is operating with nominal noise conditions. The valid values depend on the cable interface being used and the mode of operation.
secondary-modulation-profile	(Optional) Specifies the secondary modulation-profile for the upstream logical channel that is used when noise on the upstream increases to the point that the primary modulation-profile can no longer be used. The valid values are the same ranges as the primary modulation-profile. This value can be set only if the primary value is set.
tertiary-modulation-profile	(Optional) Specifies the tertiary modulation-profile for the upstream logical channel that is used when noise on the upstream increases to the point that the secondary modulation-profile can no longer be used. The tertiary modulation-profile is only available for the basic dynamic modulation. This value can be set only if the secondary value is set.

Default

There are no default values for this command.

Command mode

Config mode.

Usage guidelines

The following restrictions and conditions apply to both physical and logical channel configurations:

For normal plant use, we recommend that the uncorrectable FEC threshold remain at its default of 1 percent to avoid an unacceptable number of errors on the channel.

Example

An example of full configuration:

```
admin@CableOS(config-us-logical-channel-0)# modulation-profile 1 secondary 3
 tertiary 4
admin@CableOS(config-us-logical-channel-0)# modulation-profile-threshold primary-
secondary snr 25 corr-fec 4 uncorr-fec 2 secondary-tertiary snr 18 corr-fec 4
 uncorr-fec 1
```

Related information

cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile threshold

cable us-rf-port * us-phy-channel

cable us-rf-port * us-phy-channel * us-logical-channel * ingress-cancellation

cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile threshold

cable us-rf-port * us-phy-channel * us-logical-channel * pre-equalization
cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile

cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile threshold

To configure the upstream for the signal-to-noise ratio (SNR) and forward error correction (FEC) threshold values to be used in determining the allowable noise levels, use the `cable us-logical-channel modulation-profile-threshold` command in cable interface configuration mode. To return to the default values, use the **no** form of the command.

```
cable us-rf-port VC/VS/P us-phy-channel chl us-logical-channel ulog modulation-profile threshold
primary-secondary snr snr1 corr-fec corr-fec1 uncorr-fec uncorr-fec1 secondary-tertiary snr snr2 corr-fec corr-fec2 uncorr-fec uncorr-fec2
no cable us-rf-port  VC/VS/P us-phy-channel chl us-logical-channel ulog modulation-profile threshold
```

Syntax description

VC/ VS/ P	Specifies the upstream port number.
chl	Specifies the upstream physical channel.
ulog	Specifies the upstream logical channel number (always 0).
snr1	SNR threshold for the primary-secondary modulation-profile threshold. The valid values range from 5 to 35 dB with a default value of 24 dB.
snr2	SNR threshold for the secondary-tertiary modulation-profile threshold. The valid values range from 5 to 35 dB with a default value of 21 dB. The secondary threshold value must be less than the primary threshold.
corr-fec1, corr-fec2	Specifies the allowable number of correctable FEC errors for the upstream. The FEC-corrected parameter is given as a percentage of total packets received on the upstream during the polling period with a valid range of 1 to 30 and a default of 3.
uncorr-fec1, uncorr-fec2	Specifies the allowable number of uncorrectable FEC errors for the upstream. The FEC-uncorrected parameter is given as a percentage of total packets received on the upstream during the polling period with a valid range of 1 to 30 and a default of 1.

Default

There are no default values for this command.

Command mode

Config mode.

Usage guidelines

Dynamic Upstream Modulation-Profile Hopping (up to three profiles).

The `cable us-logical-channel modulation-profile` command assigns up to three modulation-profiles to an upstream logical channel to use the Dynamic Upstream Modulation feature. You must assign at least primary and secondary profiles to activate the Dynamic Upstream Modulation feature.

When using the Dynamic Upstream Modulation feature, the primary modulation-profile is the default profile. The COS Core SW monitors the signal-to-noise ratio (SNR) value [and forward error correction (FEC) counters] for the upstream channel, to track the upstream signal quality. For a dual modulation-profile, the COS Core monitors the SNR value, and FEC counters to track the upstream signal quality.

When the noise on the upstream channel exceeds the threshold(s) for the primary profile, the upstream channel switches to the secondary profile in a dual modulation-profile. In a three modulation-profile setup, two separate thresholds are used for switching between the primary profile and the secondary profile and from secondary profile to the tertiary profile.

For a Two-Step Dynamic Upstream Modulation, when the noise conditions improve (defined as an SNR value that is 3 dB greater than the threshold value and FEC counters that are below the threshold values), the upstream automatically switches back to the primary modulation-profile. For FEC counters, both correctedFec and uncorrectedFec must be above the thresholds.

For a Three-Step Dynamic Upstream Modulation, the user can configure the threshold values and FEC counters for the upgrade. However, there is no direct upgrade from the tertiary profile to the primary profile. The upgrade follows a sequential order, from tertiary profile to secondary profile and then to the primary profile.

For example, in a dual modulation-profile, the primary modulation-profile could be configured for 16-QAM (or mixed 16-QAM and QPSK) operation and the secondary profile for QPSK operation. If noise conditions on the upstream threaten to force CMs offline, the upstream switches to the secondary profile to implement QPSK operation. When the noise ingress conditions are resolved, the upstream switches back to 16-QAM operation.

In a Three-Step Dynamic Upstream Modulation, the primary modulation-profile could be configured for 64-QAM operation, the secondary modulation-profile for 16-QAM operation (or mixed 64-QAM and 16-QAM), and the tertiary modulation-profile for QPSK. If the noise conditions increase, the upstream switches to the secondary profile to implement 16-QAM (or mixed profile) operation and then to the tertiary modulation-profile to implement QPSK operation. When the noise ingress conditions are improved, the upstream switches back to 16-QAM operation (or mixed 64-QAM and 16-QAM), and then to the 64-QAM operation, on further improvement of noise conditions.

NOTE:

The Dynamic Upstream Modulation feature uses the SNR, CorrectedFEC, and UncorrectedFEC thresholds for 64-QAM 16-QAM, and QPSK operation to determine when to switch modulation-profiles. We recommend the use of 64-QAM, 16-QAM, and QPSK for primary, secondary, and tertiary profiles in a Three-Step Dynamic Upstream Modulation.

NOTE:

Modulation-profiles must be first created using the cable modulation-profile command before they can be assigned using the cable us-logical-channel modulation-profile command.

Examples

To set the primary modulation-profile:

```
admin@CableOS(config-us-logical-channel-0)# modulation-profile mod-prof-index
```

To set the secondary modulation-profile:

```
admin@CableOS(config-us-logical-channel-0)# modulation-profile secondary mod-prof-
index
```

To set the tertiary modulation-profile:

```
admin@CableOS(config-us-logical-channel-0)# modulation-profile tertiary mod-prof-
index
```

Related information

cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile
cable us-rf-port * us-phy-channel
cable us-rf-port * us-phy-channel * us-logical-channel * ingress-cancellation
cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile
cable us-rf-port * us-phy-channel * us-logical-channel * pre-equalization
cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile

cable us-rf-port * us-phy-channel * us-logical-channel * pre-equalization

Use the `cable us-rf-port * us-phy-channel * us-logical-channel * pre-equalization` command to set the upstream pre-equalization.

`cable us-rf-port` *VC_VS_ P* `us-phy-channel` *chl* `us-logical-channel` *ulog* `pre-equalization` [*control*] [`scale-exp` *exp*] [`snr-threshold-db` *low-thresh high-thresh*] [`rx-mer-threshold-db` *rx-mer-threshold-db*] [`power-error-threshold-db` *power-error-threshold-db*]

Syntax description

VC_VS_ P	Specifies the upstream port number.
ch1	Specifies the physical upstream channel.
ulog	Specifies the logical upstream channel number (always 0).
control	Enables or disables the pre-equalization. The default is **enabled**.

exp	This setting is a binary exponent of a scale factor of 1/(2^ *exp)*, by which the CMTS reduces each pre-equalization tap adjustment signaled to the CM. Lower scale exponents permit faster adjustment to structural micro-reflection changes, but increase the risk of adjustment flapping instability. The valid range is from 0 - 4, with a default of 0.
low-thresh high-thresh	The CMTS blocks the pre-equalization adjustment if the SNR estimate is lower than the *low-thresh*. The CMTS sends a suppressed pre-equalization adjustment if the SNR estimate is between the *low-thresh* and the *high-thresh*. The CMTS sends a pre-equalization adjustment to the CM when the channel SNR estimate is greater than the *high-thresh*. Reducing the threshold range reduces the risk of adjustment flapping instability. If the `snr-threshold-db` is not configured, the CMTS uses default thresholds based on the current data modulation of the channel. For both thresholds, the valid range is 0.0 - 50.0 with a granularity of 0.1 db.
rx-mer-threshold-db	This field determines the minimum average MER excepted. The received value should be higher than the threshold. If the value is lower, the probe will be discarded. Units: dB Default value: 20 Valid range: 6 - 40
power-error-threshold-db	This field determines the minimum power error excepted. The received value should be higher than the threshold. If the value is lower, the probe will be discarded. Units: dB Default value: 14 Valid range: 6 - 14

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

See the descriptions in the Syntax description for usage guidelines.

Related information

cable us-rf-port * us-phy-channel

cable us-rf-port * us-phy-channel * us-logical-channel * ingress-cancellation

cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile

cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile threshold

cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile

cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile

Use the `cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile` command to select a named profile to set the upstream bandwidth thresholds for Data, Voice, and Voice Emergency for a SC-QAM upstream channel.

`cable us-rf-port` *VC_VS_ P* `us-phy-channel` *chl* `us-logical-channel` *ulog* `us-channel-admission-control-profile` *profile name*

Syntax description

VC_VS_ P	Specifies the upstream port number.
ch1	Specifies the physical upstream channel.
ulog	Specifies the logical upstream channel number (always 0).
profile-name	The upstream channel admission control profile name.

Default

A profile with the name *default* always exists and if a profile name is not specified in the CLI command this profile will be used.

Command mode

Exec mode.

Usage guidelines

The `us-channel-admission-control-profile` is applied per channel under RF port.

If the channel is in **TaFDM** mode, the user should not reserve more than 40% of the channel. This guideline is not automatically validated.

Examples

The following is an example of an upstream channel admission control profile selection:

```
admin@CableOS(config)# cable us-rf-port 1:1/9 us-phy-channel 0 us-logical-channel 0
 us-channel-admission-control-profile us_profile
```

Related information

cable us-channel-admission-control-profile

cable us-rf-port * ofdma-channel * us-channel-admission-control-profile

cable us-rf-port * us-phy-channel

cable us-rf-port * us-phy-channel * us-logical-channel * ingress-cancellation

cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile

cable us-rf-port * us-phy-channel * us-logical-channel * modulation-profile threshold

cable us-rf-port * us-phy-channel * us-logical-channel * pre-equalization

cable us-scheduler

Use the `cable us-scheduler` command to define various parameters relating to bandwidth requests.

`cable us-scheduler` [`max-ack-delay-msec` *max-ack-delay-msec-value*] [`ofdma-sid-cluster-max-outstanding-bytes` *ofdma-sid-cluster-max-outstanding-bytes-value*] [`ofdma-sid-cluster-max-requested-total-bytes` *ofdma-sid-cluster-max-requested-total-bytes-value*] [`qam-sid-cluster-max-outstanding-bytes` *qam-sid-cluster-max-outstanding-bytes-value*] [`qam-sid-cluster-max-requested-total-bytes` *qam-sid-cluster-max-requested-total-bytes-value*] [`sid-cluster-max-request` *sid-cluster-max-request-value*] [`sid-cluster-max-time` *sid-cluster-max-time-value*]

Syntax description

max-ack-delay-msec-value	Defines the maximum time that the CM waits before repeating a bandwidth request. Valid range: 1 to 21. The default is 21.
ofdma-sid-cluster-max-outstanding-bytes-value	The total size, in bytes, for which there can be outstanding requests using the SID Cluster
ofdma-sid-cluster-max-requested-total-bytes-value	The total number of bytes that can be requested using the SID Cluster
qam-sid-cluster-max-outstanding-bytes-value	The total size, in bytes, for which there can be outstanding requests using the SID Cluster
qam-sid-cluster-max-requested-total-bytes-value	The total number of bytes that can be requested using the SID Cluster
sid-cluster-max-request_value	The maximum number of requests that can be made using the SID Cluster

sid-cluster-max-time-value	The total time, in milliseconds, that a service flow can continue to use the SID Cluster for requests

Command mode

Config mode.

NOTE:

The `max-ack-delay-msec` parameter is an internal parameter that allows a different configuration for different customers or setups. It is not intended for customer use.

Usage guidelines

This `max-ack-delay-msec` parameter is used to minimize latency on upstream. It defines the maximum time difference between the "Alloc Start Time" and the "Ack Time" in the "Upstream Bandwidth allocation MAP" message. Reducing the max-ack-delay period causes the modem to detect a lost BW-REQ sooner. It will then re-request and US packets will be delayed less.

When decreasing the max-ack-delay, ensure that the parameter is more than the actual US latency. Otherwise CMs will keep retransmitting the BW-REQs (even when a loss did not occur), and us-scheduler will give more bandwidth than the CM actually needs, leading to a waste of US bandwidth.

Example

```
cable us-scheduler max-ack-delay-msec 5
```

Chapter 3

CLI Commands: cap - rol

- *debug core-server process*
- *debug log firewall dropped*
- *debug packetcable cops*
- *debug packetcable gatecontrol*
- *debug packetcable subscriber*
- *debug system proto-throttle*
- *debug validation*
- *docsis ping*
- *exit*
- *fault-management no-reboot-on-fault*
- *fetch cable rpd tech-support*
- *generate csr*
- *get-status cable rpd tech-support*
- *ha master move*
- *history*
- *hostname*
- *idle-timeout*
- *install*
- *install cable rpd*
- *install certificate*
- *install csr config*
- *interface module/olt*
- *ipdr associate*
- *ipdr collector*
- *ipdr exporter*
- *ipdr session*
- *ipdr template*
- *ipdr type*
- *logging buffered*
- *logging evt*
- *logging local*
- *logging monitor*
- *logging syslog*
- *logout*
- *move down-channel*
- *network firewall*
- *network firewall logs*
- *network ntp-server*
- *packetcable*
- *packetcable cops dscp*
- *packetcable dqos-lite*
- *packetcable dynamic*
- *packetcable gate maxcount*
- *packetcable multimedia*
- *packetcable timer T0 / packetcable timer T1*
- *ping*

- *prepare cable rpd tech-support*
- *privilege*
- *prompt*
- *pwd*
- *quit*
- *radius-server host*
- *radius-server key*
- *radius-server retransmit*
- *radius-server timeout*
- *reboot*
- *reboot passive all*
- *reboot passive hitless*
- *rebalance lcce*
- *reset cable rpd*
- *restore-factory-settings*
- *restore startup-config*

Overview

This chapter contains individual descriptions of the CLI commands within the CableOS System Command Line Interface (CLI). These commands are used to interface with, configure, manage, and maintain the CableOS System.

capture cable modem

Use the `capture cable modem` command to invoke the capturing of traffic from a specified cable modem to a specified pcap file.

`capture cable-modem` [`start` | `stop`] [*ip-address* | *mac-address*] `output-file` *file-name* `captur-options` [*ds* | *us* | *data* | *mmmm* | *maps*] `file-size-limit` *size* `time-limit` *seconds*

Syntax description

`ip-address`	IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed. You must enter either an IP Address or a MAC address.
`mac-address`	MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed. You must enter either an IP Address or a MAC address.

`output-file`	(Mandatory) The name of the capture output file, which will be saved in the **srv/cableos//** directory.
`capture-options`	- ds - Capture downstream traffic - us - Capture upstream traffic - data - Capture data packets of the requested direction (ds/us/both) - mmm - Capture mmm packets of the requested direction (ds/us/both) - maps - Capture maps packets of the requested direction (ds/us/both) If only 'ds' is provided, data,mmm,maps are set automatically. If only 'us' is provided, data,mmm are set automatically (maps are only present on ds). At least one of us/ds is mandatory
`file-size-limit`	Defines the maximum capture file size limit. After the capture file reaches this limit, capturing will stop automatically. Units are in megabytes, the valid range is 1 -100, and the default value is 10.
`time-limit`	Defines the length of time for which capturing should take place. Units are in seconds, the valid range is 10 - 86400 (24 hours), and the default value is 60 (1 minute).

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

Only one instance of data capture can be run at any one time. In order to ensure that no other data capture is running, you should run the `capture cable modem stop` command first.

The command does not check if the given file name already exists in the directory. If it does, it will be overwritten.

Example

The following example shows a command to start capturing data from both the downstream and the upstream of the cable modem at address 0014.0495.7ef0. The capture will run for 60 seconds to a file called cap_data, that will be no larger than 10 MB.

```
capture cable modem start 0014.0495.7ef0 capture-options ds,us output-file
 cap_data.pcap
```

Related information

capture mmm

capture mmm

Use the `capture mmm` command to capture mmm traffic.

`capture mmm` [`filename` [*file*] | `duration-sec` [*sec*] | `size-mb` [*size*]]

NOTE:

The order of the parameters must be: filename, duration-sec, size-db.

Syntax description

sec	The capture duration in seconds <unsignedInt>.
file	The name of the capture file.
size	The capture file size in MB <unsignedInt>.

Command mode

Exec mode.

Usage guidelines

The command is a debug command. It will not work if the COSM and Core services are not running on the same server.

Example

This example shows the capture of mmm messages to a file named capt.1 for a duration of 10 seconds with file size up to 50 MB.

```
admin@CableOS> capture mmm filename capt.1 duration-sec 10 size-mb 50
tcpdump: listening on snoop_1, link-type EN10MB (Ethernet), capture size
 262144 bytes
2152 packets captured
2256 packets received by filter
0 packets dropped by kernel
```

Related information

capture cable modem

capture preconfigured us-spectrum

Use the `capture preconfigured us-spectrum` command to activate and de-activate FFT streaming from the RPD.

`capture preconfigured us-spectrum` *vc:vs /port* `sac-index` *sac-index* `start`
`capture preconfigured us-spectrum` *vc:vs /port* `sac-index` *sac-index* `stop`

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
port	The upstream RF port, 0 or 1
sac-index	The Spectrum Analyze Circuit on the RPD. Use 0 for wideband and it can capture either RF port 0 or 1. Use SACs 1 and 2 for narrowband. For narrowband, SAC 1 captures the spectrum on RF port 0, SAC 2 captures the spectrum on RF port 1.

Default

This command has no default value.

Command mode

Exec mode

Usage guidelines

Before you can use this command, you must first specify the preconfigured parameters using the `cable rpd us-spectrum-capture` command.

Either use the run-duration *run-duration* parameter in the `cable rpd us-spectrum-capture` command to determine when the FFT streaming stops or use the `stop` version of this command.

Example

The example below starts wideband FFT(Sac 0) capturing on rpd 1:0 on upstream RF port 0:

```
capture preconfigured us-spectrum 1:0/0 sac-index 0 start
```

The example below starts wideband FFT (Sac 0) capturing on rpd 1:0 on upstream RF port 1:

```
capture preconfigured us-spectrum 1:0/1 sac-index 0 start
```

The example below stops FFT capturing for Sac 0:

```
capture preconfigured us-spectrum 1:0/0 sac-index 0 stop
```

Related information

cable rpd us-spectrum-capture

show capture preconfigured us-spectrum

capture us-spectrum start

Use the `capture us-spectrum start` command to activate DOCSIS 3.1 Upstream Triggered Spectrum capture.

`capture us-spectrum` *us-rf-port* `to` *ip* `start`

Syntax description

us-rf-port	The port for which you want to capture data.
ip	The IP address to receive the captured data.

Command mode

Exec mode.

Example

To start capturing data on port 1:0/0 and to send the captured data to 10.10.10.10, execute the following command:

```
capture us-spectrum 1:0/0 to 10.10.10.10 start
```

Related information

capture us-spectrum stop

show capture us-spectrum

capture us-spectrum stop

Use the `capture us-spectrum stop` command to stop DOCSIS 3.1 Upstream Triggered Spectrum capture.

`capture us-spectrum` *us-rf-port* `stop`

Syntax description

us-rf-port	The port for which you want to stop data capture.

Command mode

Exec mode.

Usage guidelines

There are no Usage Guidelines for this command.

Example

To stop capturing data on port 1:0/0, execute the following command:

```
capture us-spectrum 1:0/0 stop
```

Related information

capture us-spectrum start

show capture us-spectrum

capture us-wb-spectrum start

Use the `capture us-wb-spectrum start` command to activate DOCSIS 3.1 Upstream Triggered Spectrum capture.

`capture us-wb-spectrum` *us-rf-port* `to` *ip*
`capture us-wb-spectrum` *vc:vs/port* `frequency-mhz` *freq* `mix-frequency-mhz` *sample-freq* `fft-size` *size* [`fft-calculation` *mode*] [`force-changes`] `to` *dest-ip* `start`

Syntax description

vc:vs/port	vc: virtual chassis id vs: virtual slot id port: port.
freq	The central frequency to capture. The valid values are: • 25.6 • 76.8 • 128 • 179.2 • 230.4 • 281.6

sample-freq	The sampling rate. The valid values are: • 102.4 • 204.8 • 409.6
size	The number of samples to capture. The valid values are: • 256 • 512 • 1024 • 2048 • 4096
mode	The fft calculation method. The valid values are internal (by hardware) or external (by destination host).
force-changes	If chosen, configuration changes will be forced to be applied even if WbFft capturing has already started. Otherwise, changes will be applied only if capturing has not yet started.
dest-ip	The IP address to receive the captured data.

Command mode

Exec mode.

Example

To start capturing data on port 1:0/0 and to send the captured data to a host with IP address 127.0.0.1, execute the following command:

```
capture us-wb-spectrum 1:0/0 fft-size 256 frequency-mhz 25.6 mix-frequency-mhz 102.4
 fft-calculation external force-changes to 127.0.0.1 start
```

Related information

capture us-wb-spectrum stop

show capture us-wb-spectrum

capture us-wb-spectrum stop

Use the `capture us-wb-spectrum stop` command to stop DOCSIS 3.1 Upstream Triggered Spectrum capture.

`capture us-wb-spectrum` *vc:vs* `stop`

Syntax description

vc:vs	vc: virtual chassis id vs: virtual slot id

Command mode

Exec mode.

Example

To stop capturing data on slot 0 of chassis 1, execute the following command:

```
capture us-wb-spectrum 1:0 stop
```

Related information

capture us-wb-spectrum start

show capture us-wb-spectrum

clear cable downstream leasequery-filter

Use the `clear cable modem leasequery-filter` command to clear the counts reported with the *show cable modem leasequery-filter* command.

`clear cable modem` { *single-cm cable-interfaces* } `leasequery-filter` [{ `ipv4 | ipv6` }]

Syntax description

single-cm	(Optional) Selects a single CM for which to clear LEASEQUERY counts.
cable-interfaces	(Optional) Selects all CMs using the *cable-interfaces* specified for which to clear LEASEQUERY counts. When neither *single-cm* nor *cable-interfaces* is specified, the CableOS Core clears all CM counts for all CMs that have a non-zero SENT count.
`ipv4`	(Optional) Displays counts for only LEASEQUERYs triggered due to unknown IPv4 version addresses.
`ipv6`	(Optional) Displays counts for only LEASEQUERYs filtered due to unknown IPv6 version addresses.

Command mode

Exec mode.

Usage guidelines

Use this command to reset counters of DHCP Leasequery messages triggered by downstream traffic.

Example

```
clear cable modem leasequery-filter ipv4
```

Related information

cable bundle source-verify leasequery downstream

cable bundle source-verify leasequery upstream

show cable downstream leasequery-filter

clear cable flap-list

Use the `clear cable flap-list` command to clear all flap counts for the specified CMs. The command does not affect the current state of the CMs, nor does it affect the reported time that the CMs are in that state.

`clear cable flap-list` [{ *cable-interfaces single CM multiple CM* }]

Syntax description

cable interfaces	Selects cable modems on one or more cable side interfaces.
single-CM	Selects a single CM.
multiple CM	Selects multiple CMs.

Command mode

Exec mode.

Usage guidelines

With no argument for cable-interfaces, single-cm, or multiple-cm, the CMTS clears the flap counts for all CMs on all MAC domains.

Example

The following example clears one or all cable modems from the flap list:

```
clear cable flap-list 0102.0304.0506
```

Related information

show cable flap-list

clear cable flap-sum

Use the `clear cable flap-sum` command to clear all flap counts for the specified CMs. The command does not affect the current state of the CMs, nor does it affect the reported time that the CMs are in that state.

`clear cable flap-sum`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

With no argument for cable-interfaces, single-cm, or multiple-cm, the CMTS clears the flap counts for all CMs on all MAC domains.

Example

The following example clears the flap sum:

```
clear cable flap-sum
```

Related information

show cable flap-list

clear cable host

Use the `clear cable host` command to clear the CableOS Core database of one or more learned CPE entries.

`clear cable host` { *cpe-ip-address cpe-mac-address* `| cm` |… }{ `vlan cre-vlan-id | all`}

Syntax description

cpe-ip-address	(Optional) Selects a single CPE by its IPv4 or IPv6 address.
cpe-mac-address	(Optional) Selects a single CPE by its Ethernet MAC address.
`cre-vlan-id`	(Optional) Selects all CPEs learned on the cable bundle or sub-bundle encapsulated with the VLAN *cre-vlan-id*.
`all`	(Optional) Selects all learned CPEs on the CableOS Core.

Command mode

Exec mode.

Usage guidelines

This command removes all dynamically learned forwarding information on the CableOS Core for the selected CPEs. Dynamically learned CPE forwarding information includes:

- The CM, IP and MAC addresses of CPEs learned from snooping DHCP
- The CM, IP and MAC addresses of CPEs learned from upstream ARP requests or responses, for example, as within a static SAV prefix.

The command does not affect CM forwarding information.

Related information

cable filter group

cable submgmt default active

cable submgmt default filter-group

cable submgmt default cpe-max-ipv4 cpe-max-ipv6

show cable filter

clear cable load-balance

Use the `clear cable load-balance` command to clear the counters or state machine used to track load-balancing operations.

`clear cable load-balance` { *counters state* }

Syntax description

counters	Clears all load balancing statistical counters.
state	Clears all state information in the load balancing state machine.

Command mode

Exec mode.

Usage guidelines

The `clear cable load-balance counters` command forces the CMTS to remove all database information associated with DCC/DBC requests that send during DLB: SUCCEEDED, FAILED, LOST, TOTAL requests. The `clear cable load-balance state` command forces the CMTS to remove database information associated with DLB iterations: AVG RUN TIME, TOTAL ITERATION COUNTS.

This command can clear DLB statistics from the CMTS database before collecting it again.

Examples

The following example clears all the counters that track load-balancing operations, resetting them all to zero:

```
clear cable load-balance counters
```

The following example clears the state machine that is used for load-balancing operations:

```
clear cable load-balance state
```

Related information

cable load-balance
cable load-balance balancing-period secs
cable load-balance exclude
cable load-balance fail-exclude-period-secs
cable load-balance move-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
show cable load-balance
show cable load-balance exclude-list

clear cable modem offline delete

Use the `clear cable modem offline delete` command to delete either all CableOS Core database information associated with an individual offline cable modem, or to delete all NSG CMTS information associated with offline cable modems on one or more cable interfaces.

`clear cable modem { single-cm } delete offline clear cable modem [ cable-interfaces ] offline delete`

Syntax description

`single-cm`	Selects a single offline CM using the syntax described in *CLI: Cable interface identifiers syntax*. The “cpe-mac”, “cpe-ip”, and “cpe-ip” options for single-cm will not match any offline CMs.
`cable-interfaces`	Selects all offline CMs on a set of cable-side interfaces, using the syntax described in *CLI: Cable interface identifiers syntax*.

Command mode

Exec mode.

Usage guidelines

This command forces the CMTS to remove all database information associated with a single offline CM or multiple CMs. This command can clear offline CMs from the CMTS database before the CableOS Core automatically deletes them after 24 hours.

Example

```
clear cable modem 1:0/0 offline delete
```

clear cable modem flap-counters

Use the `clear cable modem flap-counters` command to clear all flap counts for the specified CMs, or group of CMs. The command does not affect the current state of the CMs, nor does it affect the reported time that the CMs are in that state.

`clear cable modem` [{ *cable-interfaces single CM multiple CM* }] `flap-counters`

Syntax description

cable interfaces	Selects cable modems on one or more cable side interfaces.
single-CM	Selects a single CM.
multiple CM	Selects multiple CMs.

Command mode

Exec mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Example

The following example clears all the flap counters from the specified modem:

```
clear cable modem 0102.0304.0506 flap-counters
```

clear cable modem leasequery-filter

Use the `clear cable modem leasequery-filter` command to clear the counts reported with the `show cable modem leasequery-filter` command.

`clear cable downstream leasequery-filter` { *single-cm* | *cable-interfaces* }

Syntax description

single-cm	(Optional) Selects a single CM for which to clear LEASEQUERY counts.
cable-interfaces	(Optional) Selects all CMs using the *cable-interfaces* specified for which to clear LEASEQUERY counts. When neither *single-cm* nor *cable-interfaces* is specified, the CableOS Core clears per-CM counts for all CMs that have a non-zero SENT count.

Command mode

Exec mode.

Use this command to reset counters of DHCP Leasequery messages triggered by upstream CM traffic.

Example

```
clear cable modem leasequery-filter
```

Related information

cable bundle source-verify leasequery downstream

cable bundle source-verify leasequery upstream

show cable downstream leasequery-filter

clear cable modem reset

Use the `clear cable modem reset` command to force either an individual cable modem or multiple cable modems to re-initialize on DOCSIS.

`clear cable modem` { `single-cm` } `reset` `clear cable modem` [`cable-interfaces`] { *all multiple-cm* } `reset`

Syntax description

`single-cm`	Selects a single offline CM using the syntax described in *CLI: Cable interface identifiers syntax*.
`cable-interfaces`	Selects all offline CMs on a set of cable-side interfaces, using the syntax described in *CLI: Cable interface identifiers syntax*. If this argument is omitted, all mac-domains on the chassis are selected.
all	Resets all CMs on the selected cable-interfaces.
multiple-cm	Resets all CMs matching the criteria described in *Cable modem selection*.

Command mode

Exec mode.

Usage guidelines

This command forces a CM or set of CMs to re-register. For the single-modem form of this command, the CableOS Core sends an unsolicited Abort Ranging Response message to force the CM to immediately re-initialize. For the multiple-modem form of this command, the CableOS Core discontinues station maintenance to the selected CMs, which causes them to re-initialize with a T4 timeout after 30 seconds.

A CM is considered to be capable of downstream bonding when its registration request enables TLV 5.29 Multiple Receive Channel Support.

This command does not force the CM to reset its CPU or perform a power-cycle reset.

Example

```
clear cable modem 1:0/0 reset
```

clear cable proto-throttle counters

Use the `clear cable proto-throttle counters` command to clear the counts and MAC information for all upstream protocols. When a counter reaches its maximum, throttling continues, but the counter stops accumulating until it is cleared.

`clear cable proto-throttle counters`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

Use this command to reset counters of throttled packets per protocol and MAC domain.

Example

The following clears all the counters:

```
clear cable proto-throttle counters
```

Related information

cable proto-throttle

show system proto-throttle

clear cluster history

Use the `clear cluster history` command to clear the history log of the current cluster.

`clear cluster history`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

The command clears all previous events from the history log of the current cluster and adds the following line to the log: *History was cleared*.

Example

```
clear cluster history
```

Related information

ha master move

rebalance lcce

show cluster history

clear cm-status

To clear the history of received CM-STATUS events (as displayed by the `show cable modem cm-status` command), use the `clear cm-status` command.

`clear cm-status` [*single-cm* | *cable-interfaces*]

Syntax description

single-cm	(Optional) Selects a CM, as specified in the *Cable modem selection* section.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.

Default

This command has no default value.

Command mode

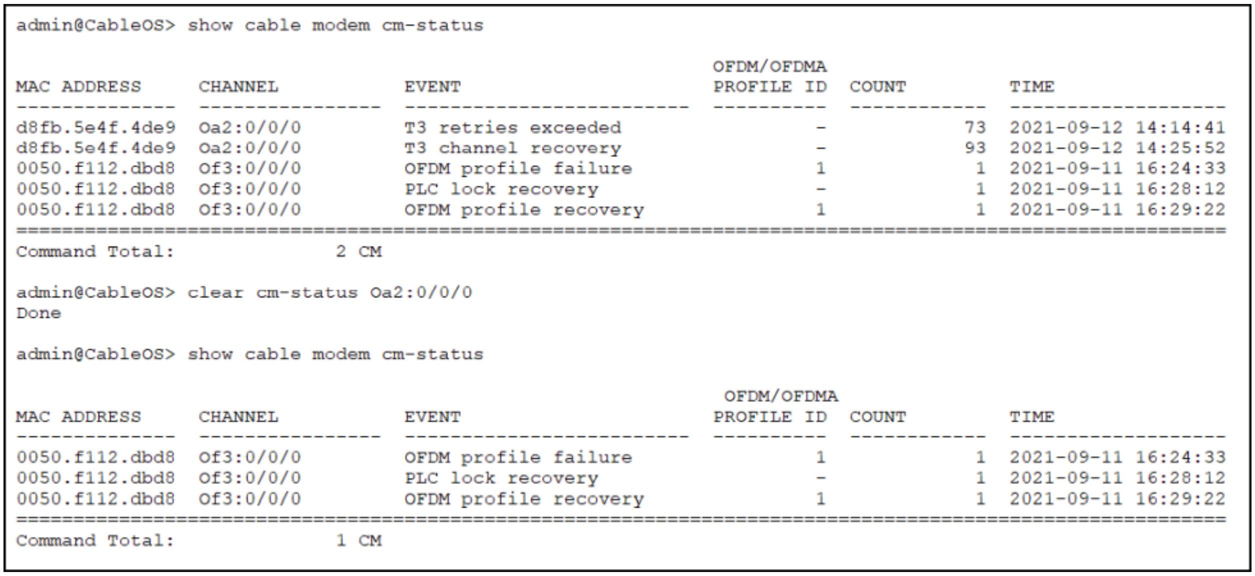
Exec mode

Usage guidelines

If you do not clear the history, you may find the the output of the `show cable modem cm-status` command is too large to be useful. If you enter the command with no CM information, all history will be cleared.

Examples

The example below shows the output from a `show cable modem cm-status` command before and after running the `clear cm-status` command.



```
admin@CableOS> show cable modem cm-status

                                                             OFDM/OFDMA
MAC ADDRESS     CHANNEL           EVENT                      PROFILE ID  COUNT         TIME
--------------  ----------------  -------------------------  ----------  ------------  -------------------
d8fb.5e4f.4de9  Oa2:0/0/0         T3 retries exceeded                 -            73  2021-09-12 14:14:41
d8fb.5e4f.4de9  Oa2:0/0/0         T3 channel recovery                 -            93  2021-09-12 14:25:52
0050.f112.dbd8  Of3:0/0/0         OFDM profile failure                1             1  2021-09-11 16:24:33
0050.f112.dbd8  Of3:0/0/0         PLC lock recovery                   -             1  2021-09-11 16:28:12
0050.f112.dbd8  Of3:0/0/0         OFDM profile recovery               1             1  2021-09-11 16:29:22
==========================================================================================================
Command Total:              2 CM

admin@CableOS> clear cm-status Oa2:0/0/0
Done

admin@CableOS> show cable modem cm-status

                                                              OFDM/OFDMA
MAC ADDRESS     CHANNEL           EVENT                      PROFILE ID  COUNT         TIME
--------------  ----------------  -------------------------  ----------  ------------  -------------------
0050.f112.dbd8  Of3:0/0/0         OFDM profile failure                1             1  2021-09-11 16:24:33
0050.f112.dbd8  Of3:0/0/0         PLC lock recovery                   -             1  2021-09-11 16:28:12
0050.f112.dbd8  Of3:0/0/0         OFDM profile recovery               1             1  2021-09-11 16:29:22
==========================================================================================================
Command Total:              1 CM
```

Related information

show cable modem cm-status

clear system proto-throttle

Use the `clear system-proto-throttle` command to clear the protocol throttling sent/filtered counters for the specified protocols.

```
clear system proto-throttle [{arp  | dhcp | rip | igmp | nd | dhcpv6 | mld
| total | other}]
```

Command mode

Exec mode.

Usage guidelines

Using the command with no parameters clears all counters.

Example

The following example clears the counters for the DHCP protocol:

```
clear system proto-throttle dhcp
```

Related information

system proto-throttle

show system proto-throttle

CLI Engine Built-in Commands

This table includes CableOS built-in commands.

`cat` *<file>*	Concatenates a file
`cd` *<directory>*	Changes directory
`clear history`	Clears the command history
`complete-on-space [false | true]`	Controls if command completion should be attempted when <space> is entered. Entering <tab> always results in command completion. Default: **false**
`copy` *<file>*	Copies a file
`copy startup-config running-config`	Copies the startup configuration to the running configuration
`copy` *<url>*	Copies a URL to the CLI working directory
`delete` *<file>*	Deletes a file
`describe` *<command>*	Displays detailed information about a command
`dir`	Displays the directory contents
`display-level` *<depth>*	Sets the configuration node display level
`file list`*<directory>*	Lists files in the directory
`file show` *<file>*	Displays the contents of the file
`help` *<command>*	Displays help text related to the command
`history` *<size>*	Sets the size of the CLI command history. Default: 100
`id`	Displays user ID information
`ignore-leading-space [false | true]`	Ignores leading white space
`job stop` *<id>*	Stops a background job
`ls[file | dir]`	Displays the contents of files and directories
`mkdir` *<directory>*	Creates a directory
`more` *<file>*	Displays the file contents
`output-file` *<file>*	Copies output to a file or terminal
`paginate [false | true]`	Paginate output from CLI commands
`rm [file | dir]`	Removes files or directories
`rmdir` *<dir>*	Removes empty directories

`screen-length` *<number of rows>*	Configures the screen length in rows
`screen-width` *<number of columns>*	Configures the screen width in columns
`send` *<user> <message>*	Sends a message to the terminal of one or all users
`show all-commands`	Lists all commands. To list all configuration commands, use `show all-commands | include running-config`
`show cli`	Displays the CLI engine's built-in command settings.
`show clock`	Displays the current system time.
`show defaults`	Enables or disables showing of default values. If used without parameters, it shows the current mode (enabled | disabled)
`show jobs`	Displays background jobs
`show user`	Displays currently logged on users.
`source` *<file>*	This command is similar to the Linux shell command. It executes the content of the file passed as argument.
`terminal` *<generic/xterm/vt100/ansi/linux>*	Sets the terminal type
terminal <generic/xterm/vt100/ansi/linux>	Sets the terminal type
`timestamp [disable | enable]`	Enables or disables the display of the timestamp during commit
`write`	Copies the currently running CableOS Core configuration to the starting configuration. The same as the `copy running-config startup-config` command.

cli prompt

To permanently modify the prompt for both the operational mode and the configuration mode, use the `cli prompt` command:

`cli [ prompt1 | prompt2 ]` *str*

Syntax description

`prompt1`	Defines the prompt for operational mode
`prompt2`	Defines the prompt for configuration mode

str	Use one of the special characters below: • \d - the date in "YYYY-MM-DD" format (for example, "2018-01-18") • \h - the hostname up to the first period ('.') • \H - the full hostname • \s - the client source IP • \t - the current time in 24-hour HH:MM:SS format • \T - the current time in 12-hour HH:MM:SS format • \@ - the current time in 12-hour am/pm format • \A - the current time in 24-hour HH:MM format • \u - the username of the current user • \m - the mode name (exec or config) • \M - the mode name (exec or config) inside parenthesis

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

cli prompt1 is for the operational mode prompt and cli prompt2 is for the configuration mode. For prompt2 to take effect, you must exit config mode and then re-enter config mode.

Examples

To set the exec mode prompt to "{user}@{hostname}> " (e.g: "admin@cs010> "), use the following command:

```
cli prompt1 "\u@\h> "
commit
```

To set the config mode prompt to "{user}@{hostname}(config)# " (e.g: "admin@cs010(config) ", use the following command:

```
cli prompt2 "\u@\h\M# "
commit
```

Related information

prompt

clock summer-time

To configure automatic adjustment of the CableOS Manager's logging timestamps for Daylight Saving Time (DST), use the `clock summer-time` command:

`clock summer-time zone recurring` [*start-week start-day start-month start-hh:mm end-week end-day end-month end-hh:mm* [`offset-mins`]]

To disable any adjustments of logging timestamps for daylight saving time, use the **no** form of this command:

`no clock summer-time` [`zone recurring` [*start-week start-day start-month start-hh:mm end-week end-day end-month end-hh:mm* [`offset-mins`]]]

Syntax description

`zone`	Abbreviation of time zone to report during daylight savings. For example, "EDT". Use the standardized abbreviations found at *http://www.timeanddate.com/time/zones/*.
start-week	Ordinal number of the week of a month when DST starts. Valid values: Any integer 1-5 or the word **last**.
start-day	Day of the week when DST starts.
start-month	String with the full name or three-letter abbreviation of the month when DST starts.
start-hh:mm	Hour and minute in 24-hour military format at which DST starts. For example, 02:00.
end-week	Ordinal number of the week of a month when DST ends. Valid values: Any integer 1-5 or the word **last**.
end-day	Day of the week when DST ends.
end-month	String with the full name or three-letter abbreviation of the month when DST ends.
end-hh:mm	Hour and minute in 24-hour military format at which DST ends. For example, 02:00.
`offset-mins`	Optional. Number of minutes to "spring forward" at the start of DST and to "fall back" at the end of DST. If omitted, the default of 60 minutes is used.

Default

```
no clock summer-time
```

Command mode

Config mode.

Usage guidelines

All arguments after the “recurring” keyword may be omitted, in which case the command assumes defaults for the United States, where daylight saving time starts on the second Sunday in March and ends on the first Sunday in November, with the time changes taking place at 02:00 local time. For example,

```
    clock summer-time PDT recurring
```

is equivalent to

```
    clock summer-time PDT recurring 2 Sunday march 02:00 1 Sunday November 02:00 60
```

Example

The following example sets summer time information for the UK, starting at 01:00 on the last Sunday in March and ending at 02:00 on the last Sunday in October:

```
clock summer-time BDST recurring last Sunday Mar 01:00 last Sunday Oct 02:00 60
```

Related information

clock timezone

set clock

clock timezone

To set the time zone of the System, use the `clock timezone` command. To remove the timezone setting, use the **no** form of the command.

`clock timezone zone` *hours-offset* [*minutes-offset*]

Syntax description

`zone`	The abbreviated name of the time zone as standardized at *http://www.timeanddate.com/time/zones/*.
hours-offset	The number of hours offset from UTC. The valid range is a signed integer from -12 to +12. This parameter is mandatory.
minutes-offset	The number of minutes offset from UTC. The valid range is a signed integer from -30 to +30. This parameter is optional.

Default

```
no clock timezone
```

Command mode

Config mode.

Usage guidelines

This command sets the timezone displayed on all log messages.

Example

The following example sets the timezone for New York:

```
clock timezone EST -5
```

Related information

clock summer-time

network ntp-server

set clock

config

Use the `config` command to put the system into configure mode. The options have a slightly different meaning depending on how the system is configured; with a writable running configuration, with a startup configuration, or with a candidate configuration.

`config [{terminal | shared | exclusive}]`

Syntax description

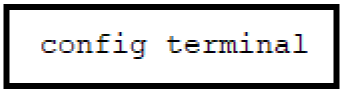
`terminal (writable running enabled)`	Edit a private copy of the running configuration, no lock is taken.
`terminal (writable running disabled, startup enabled)`	Edit a private copy of the startup configuration, no lock is taken.
`exclusive (candidate enabled)`	Lock the running configuration (if enabled) and the startup configuration, and edit the startup configuration.
`shared (writable running enabled, candidate enabled)`	Edit the candidate configuration without locking it.

Command mode

Exec mode.

Example

The following example enables CLI configuration mode:



```
config terminal
```

copy <file-name> running-config

Use the `copy <file-name> running-config` command to merge a saved configuration file to the running configuration.

`copy <file-name> running-config`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Example

The following example merges a file called file1.cfg to the running configuration:

```
copy file1.cfg running-config
```

Related information

copy <file-name> startup-config

copy running-config <file-name>

show running-config

show startup-config

copy <file-name> startup-config

Use the `copy <file-name> startup-config` command to copy a saved configuration file to the starting configuration.

`copy running-config startup-config`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Example

The following example copies a file called file1.cfg to the starting configuration:

```
copy file1.cfg startup-config
```

Related information

copy <file-name> running-config
copy running-config <file-name>
show running-config
show startup-config
copy startup-config passive

copy running-config startup-config

Use the `copy running-config startup-config` command to copy the currently running CableOS Core configuration to the starting configuration.

```
copy running-config startup-config
```

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Example

The following example copies the currently running CableOS Core configuration to the starting configuration:

```
copy running-config startup-config
```

Related information

copy <file-name> running-config
copy <file-name> startup-config
copy running-config <file-name>
show running-config
show startup-config
copy startup-config running-config

copy running-config <file-name>

Use the `copy running-config <file-name>` command to save the currently running CableOS Core configuration to a file.

`copy running-config <file-name>`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Example

The following example copies the currently running CableOS Core configuration to a file named file1.cfg:

```
copy running-config file1.cfg
```

Related information

copy <file-name> running-config
copy <file-name> startup-config
copy running-config startup-config
copy startup-config <file-name>
show running-config
show startup-config

copy startup-config <file-name>

Use the `copy startup-config <file-name>` command to save the startup configuration to a file.

`copy startup-config <file-name>`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Example

The following example copies the startup configuration to a file named file1.cfg:

```
copy startup-config file1.cfg
```

Related information

copy <file-name> running-config
copy <file-name> startup-config
copy running-config startup-config
copy running-config <file-name>
show running-config
show startup-config
copy startup-config passive
restore startup-config

copy startup-config passive

Use the `copy startup-config passive` command to apply the startup configuration to a passive partition.

```
copy startup-config passive <node | all>
```

Command mode

Exec mode.

Usage guidelines

This command enables checking for configuration conflicts between the current release and the one that the user is going to switch to.

After successful installation of a new release on the passive partition, the user calls the

```
copy startup-config passive all
```

command and checks if the configuration was applied successfully.

Configuration from the startup-config file is applied to passive partitions of all online nodes and a summary is returned to the user.

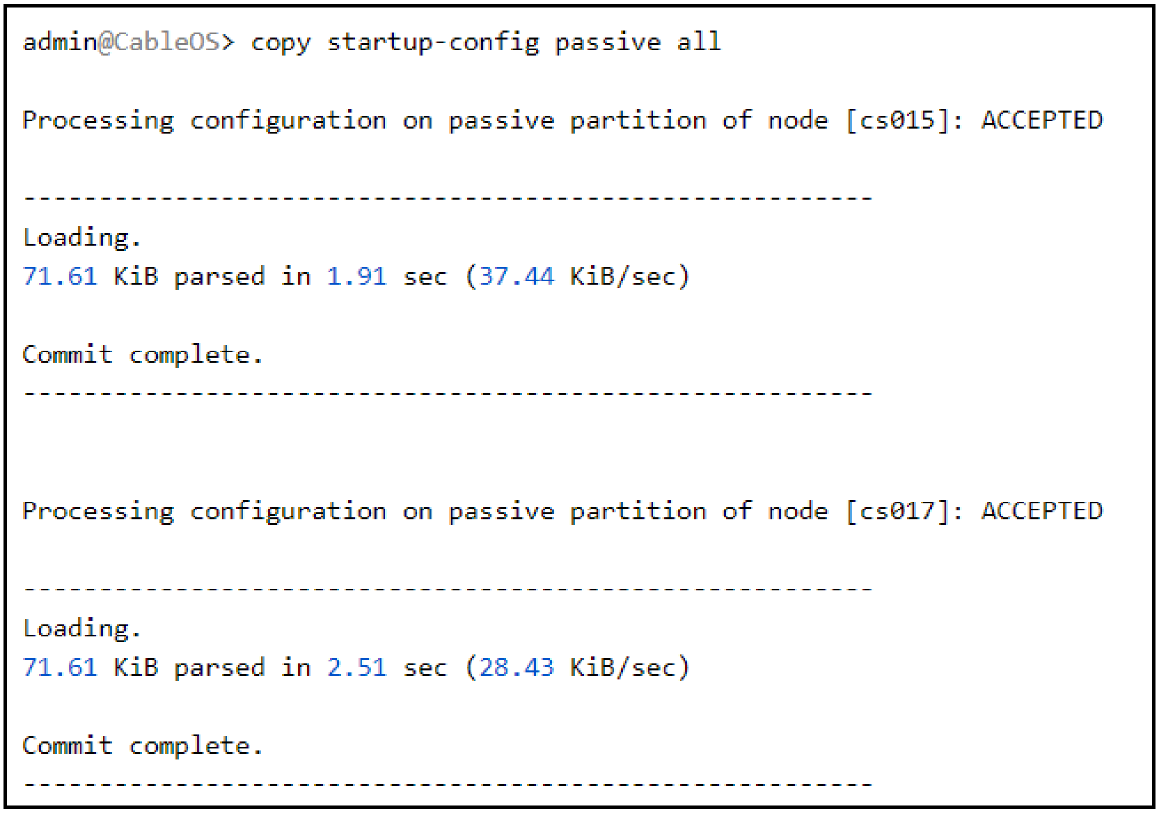
If any issues are raised, the user can decide how to change the configuration, or cancel switching to the new release until a fixed release is available.

It is recommended that this command is always used before rebooting to the passive partition to avoid any configuration issues.

A side effect of using this command is a quicker-starting system after reboot; the initial startup-config import procedure is skipped since configuration was already applied to the passive partition.

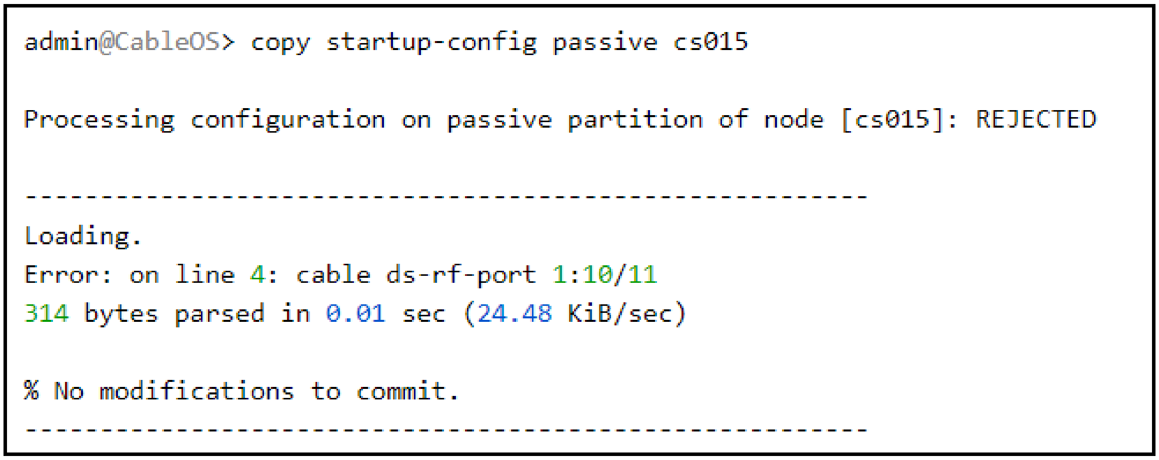
Examples

The following example successfully applies `copy startup-config passive` to all online nodes:



```
admin@CableOS> copy startup-config passive all

Processing configuration on passive partition of node [cs015]: ACCEPTED

--------------------------------------------------------
Loading.
71.61 KiB parsed in 1.91 sec (37.44 KiB/sec)

Commit complete.
--------------------------------------------------------


Processing configuration on passive partition of node [cs017]: ACCEPTED

--------------------------------------------------------
Loading.
71.61 KiB parsed in 2.51 sec (28.43 KiB/sec)

Commit complete.
--------------------------------------------------------
```

The following example fails to apply `copy startup-config passive` to a specific passive node:



```
admin@CableOS> copy startup-config passive cs015

Processing configuration on passive partition of node [cs015]: REJECTED

--------------------------------------------------------
Loading.
Error: on line 4: cable ds-rf-port 1:10/11
314 bytes parsed in 0.01 sec (24.48 KiB/sec)

% No modifications to commit.
--------------------------------------------------------
```

Related information

copy startup-config running-config

copy <file-name> startup-config

copy running-config startup-config
copy startup-config <file-name>
copy <file-name> startup-config

copy startup-config running-config

Use the `copy startup-config running-config` command to copy the startup configuration to the running configuration.

`copy startup-config running-config`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Example

The following example copies the startup configuration to the running configuration:

```
copy startup-config running-config
```

Related information

copy startup-config passive
copy running-config startup-config

debug cable modem

Use the `debug cable modem` command to help debug a specified cable modem by displaying its MULPI logs to the screen.

`debug cable modem [` *mac-address* `|` *ip-address* `]`

Syntax description

mac-address	(Optional) MAC address of a specific CM to be displayed.
ip-address	(Optional) IPv4 or IPv6 address of a specific CM to be displayed.

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

If the specified address does not match any of the known cable modems, the following message to the user will be displayed:

```
Can't find modem with specified IP.
```

If the cable modem is managed in the backup node, the command is executed through the SSH tunnel and the output displayed in the same way. In this case, the first line of the output will be `doing remote`. For modems that are managed by the local node, the first output line will be `doing local`.

debug cable proto-throttle

Use the `debug cable proto-throttle` command to display the packets that were throttled, per specified MAC address.

`debug cable proto-throttle` *<mac-addr> <count>*

Syntax description

mac-addr	The specified MAC address.
count	Limits the number of displayed logged packets.

Command mode

Config mode.

Usage guidelines

There are no Usage Guidelines for this command.

debug core-server process

Use the `debug core-server process` command to troubleshoot the system.

`debug core-server` { *core-server* } `process` { *process* } { *function-name* } { *function-params* } { *data-path show-ds-qos* } { *data-path show-stats* } { *data-path show-utilization* }

NOTE: This command should be used ONLY by Harmonic personnel.

Syntax description

`core-server`	Debug the cluster server process of a specific core-server in the cluster. You can find the available hostnames by using the `show cluster status` command.
`process`	The internal process to be debugged: **uspp** or **scheduler**.

`function-name/ function-params`	function-name *uspp* show-utilization-no *function-params* show-stats-no *function-params* show-ds-qos*no function-params* function-process us*scheduler* *show-stats* *clear-stats* *no params* - show aggregated counters *clear-on-read* - show counters and clear aggregation
`data-path show-ds-qos`	Dumps QoS and traffic management counters of the data-path module.
`data-path show-stats`	Dumps general status and counters of the data-path module.
`data-path show-utilization`	Shows bandwidth utilization of the DS channels and additional information of the various QoS elements within the data-path module.

Default

- core-server: If this parameter is omitted, the command displays the process on the active core-server manager. (COS-M)
- process: If this parameter is omitted, the command displays a list of processes available.

Command mode

Exec mode.

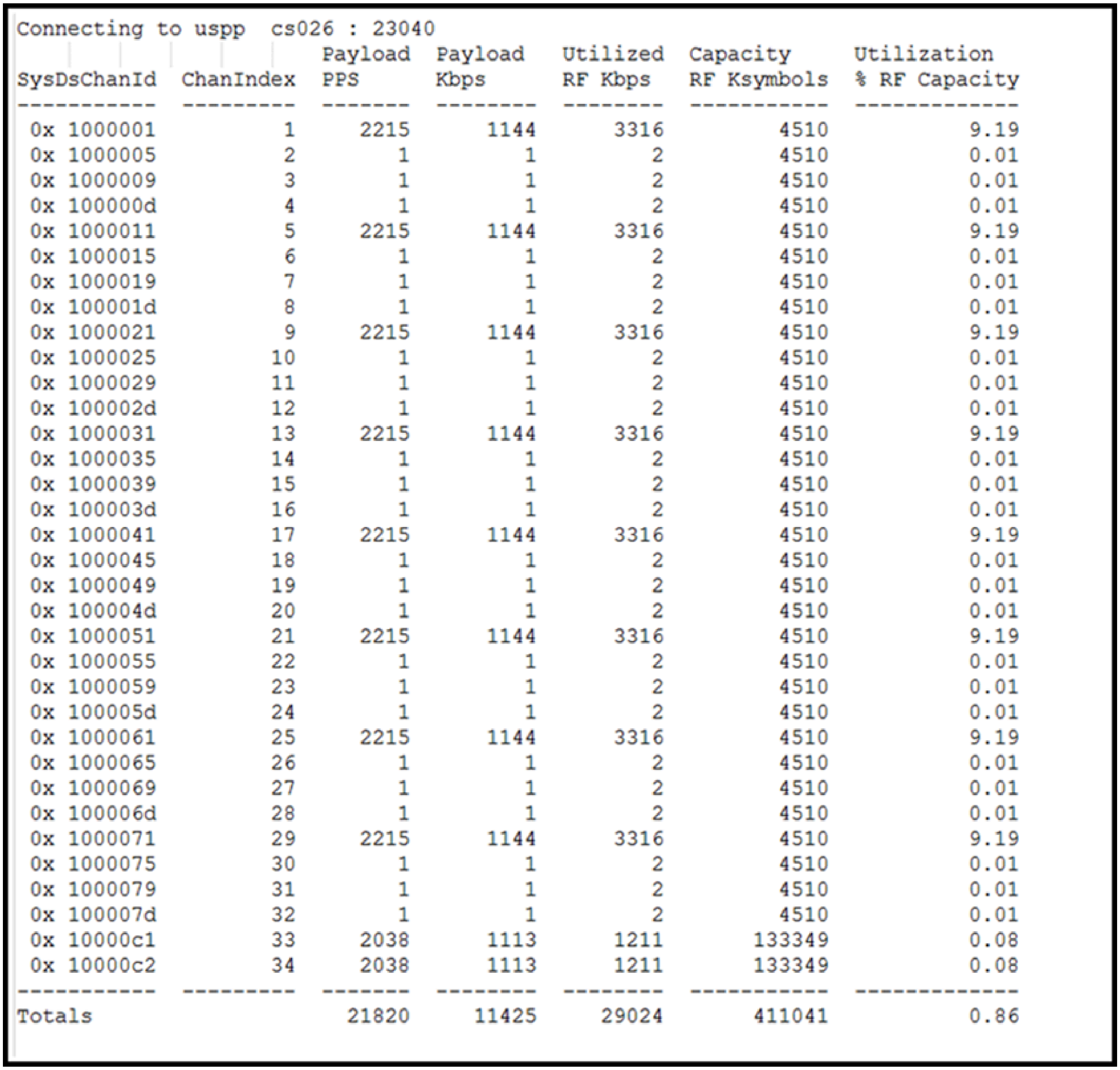
Usage guidelines

This command helps troubleshoot the system and should be used ONLY by Harmonic personnel. It is also used to clear SNMP and IPDR aggregation counters.

Examples

The following example shows the utilization statistics for the uspp process on server cs026:

```
debug core-server cs026 process uspp show-utilization
```



```
Connecting to uspp  cs026 : 23040
                        Payload  Payload   Utilized  Capacity     Utilization
SysDsChanId  ChanIndex  PPS      Kbps      RF Kbps   RF Ksymbols  % RF Capacity
-----------  ---------  -------  --------  --------  -----------  -------------
 0x 1000001          1     2215      1144      3316         4510           9.19
 0x 1000005          2        1         1         2         4510           0.01
 0x 1000009          3        1         1         2         4510           0.01
 0x 100000d          4        1         1         2         4510           0.01
 0x 1000011          5     2215      1144      3316         4510           9.19
 0x 1000015          6        1         1         2         4510           0.01
 0x 1000019          7        1         1         2         4510           0.01
 0x 100001d          8        1         1         2         4510           0.01
 0x 1000021          9     2215      1144      3316         4510           9.19
 0x 1000025         10        1         1         2         4510           0.01
 0x 1000029         11        1         1         2         4510           0.01
 0x 100002d         12        1         1         2         4510           0.01
 0x 1000031         13     2215      1144      3316         4510           9.19
 0x 1000035         14        1         1         2         4510           0.01
 0x 1000039         15        1         1         2         4510           0.01
 0x 100003d         16        1         1         2         4510           0.01
 0x 1000041         17     2215      1144      3316         4510           9.19
 0x 1000045         18        1         1         2         4510           0.01
 0x 1000049         19        1         1         2         4510           0.01
 0x 100004d         20        1         1         2         4510           0.01
 0x 1000051         21     2215      1144      3316         4510           9.19
 0x 1000055         22        1         1         2         4510           0.01
 0x 1000059         23        1         1         2         4510           0.01
 0x 100005d         24        1         1         2         4510           0.01
 0x 1000061         25     2215      1144      3316         4510           9.19
 0x 1000065         26        1         1         2         4510           0.01
 0x 1000069         27        1         1         2         4510           0.01
 0x 100006d         28        1         1         2         4510           0.01
 0x 1000071         29     2215      1144      3316         4510           9.19
 0x 1000075         30        1         1         2         4510           0.01
 0x 1000079         31        1         1         2         4510           0.01
 0x 100007d         32        1         1         2         4510           0.01
 0x 10000c1         33     2038      1113      1211       133349           0.08
 0x 10000c2         34     2038      1113      1211       133349           0.08
-----------  ---------  -------  --------  --------  -----------  -------------
Totals                    21820     11425     29024       411041           0.86
```

debug log firewall dropped

Use the `debug log firewall dropped` command to display log messages for packages dropped by the firewall.

`debug log firewall dropped` [| *node-id*]

Syntax description

`all`	All log messages will be displayed.
node-id	Only log messages from the specified node will be displayed.

Default

This command has no default value.

Command mode

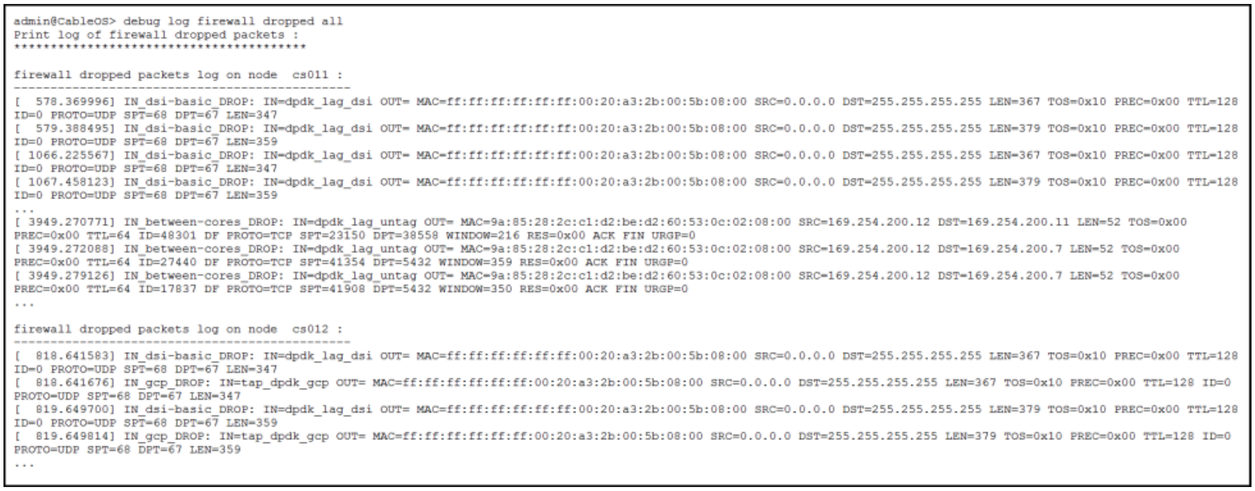
Exec mode

Usage guidelines

The command will dump into the screen all the log messages of packages dropped by the firewall. For the command to work, firewall and firewall logs must be enabled.

Examples

The example below shows the display off logs for all Core servers:



```
admin@CableOS> debug log firewall dropped all
Print log of firewall dropped packets :
****************************************

firewall dropped packets log on node  cs011 :
----------------------------------------------
[  578.369996] IN_dsi-basic_DROP: IN=dpdk_lag_dsi OUT= MAC=ff:ff:ff:ff:ff:ff:00:20:a3:2b:00:5b:08:00 SRC=0.0.0.0 DST=255.255.255.255 LEN=367 TOS=0x10 PREC=0x00 TTL=128
ID=0 PROTO=UDP SPT=68 DPT=67 LEN=347
[  579.388495] IN_dsi-basic_DROP: IN=dpdk_lag_dsi OUT= MAC=ff:ff:ff:ff:ff:ff:00:20:a3:2b:00:5b:08:00 SRC=0.0.0.0 DST=255.255.255.255 LEN=379 TOS=0x10 PREC=0x00 TTL=128
ID=0 PROTO=UDP SPT=68 DPT=67 LEN=359
[ 1066.225567] IN_dsi-basic_DROP: IN=dpdk_lag_dsi OUT= MAC=ff:ff:ff:ff:ff:ff:00:20:a3:2b:00:5b:08:00 SRC=0.0.0.0 DST=255.255.255.255 LEN=367 TOS=0x10 PREC=0x00 TTL=128
ID=0 PROTO=UDP SPT=68 DPT=67 LEN=347
[ 1067.458123] IN_dsi-basic_DROP: IN=dpdk_lag_dsi OUT= MAC=ff:ff:ff:ff:ff:ff:00:20:a3:2b:00:5b:08:00 SRC=0.0.0.0 DST=255.255.255.255 LEN=379 TOS=0x10 PREC=0x00 TTL=128
ID=0 PROTO=UDP SPT=68 DPT=67 LEN=359
...
[ 3949.270771] IN_between-cores_DROP: IN=dpdk_lag_untag OUT= MAC=9a:85:28:2c:c1:d2:be:d2:60:53:0c:02:08:00 SRC=169.254.200.12 DST=169.254.200.11 LEN=52 TOS=0x00
PREC=0x00 TTL=64 ID=48301 DF PROTO=TCP SPT=23150 DPT=38558 WINDOW=216 RES=0x00 ACK FIN URGP=0
[ 3949.272088] IN_between-cores_DROP: IN=dpdk_lag_untag OUT= MAC=9a:85:28:2c:c1:d2:be:d2:60:53:0c:02:08:00 SRC=169.254.200.12 DST=169.254.200.7 LEN=52 TOS=0x00
PREC=0x00 TTL=64 ID=27440 DF PROTO=TCP SPT=41354 DPT=5432 WINDOW=359 RES=0x00 ACK FIN URGP=0
[ 3949.279126] IN_between-cores_DROP: IN=dpdk_lag_untag OUT= MAC=9a:85:28:2c:c1:d2:be:d2:60:53:0c:02:08:00 SRC=169.254.200.12 DST=169.254.200.7 LEN=52 TOS=0x00
PREC=0x00 TTL=64 ID=17837 DF PROTO=TCP SPT=41908 DPT=5432 WINDOW=350 RES=0x00 ACK FIN URGP=0
...

firewall dropped packets log on node  cs012 :
----------------------------------------------
[  818.641583] IN_dsi-basic_DROP: IN=dpdk_lag_dsi OUT= MAC=ff:ff:ff:ff:ff:ff:00:20:a3:2b:00:5b:08:00 SRC=0.0.0.0 DST=255.255.255.255 LEN=367 TOS=0x10 PREC=0x00 TTL=128
ID=0 PROTO=UDP SPT=68 DPT=67 LEN=347
[  818.641676] IN_gcp_DROP: IN=tap_dpdk_gcp OUT= MAC=ff:ff:ff:ff:ff:ff:00:20:a3:2b:00:5b:08:00 SRC=0.0.0.0 DST=255.255.255.255 LEN=367 TOS=0x10 PREC=0x00 TTL=128 ID=0
PROTO=UDP SPT=68 DPT=67 LEN=347
[  819.649700] IN_dsi-basic_DROP: IN=dpdk_lag_dsi OUT= MAC=ff:ff:ff:ff:ff:ff:00:20:a3:2b:00:5b:08:00 SRC=0.0.0.0 DST=255.255.255.255 LEN=379 TOS=0x10 PREC=0x00 TTL=128
ID=0 PROTO=UDP SPT=68 DPT=67 LEN=359
[  819.649814] IN_gcp_DROP: IN=tap_dpdk_gcp OUT= MAC=ff:ff:ff:ff:ff:ff:00:20:a3:2b:00:5b:08:00 SRC=0.0.0.0 DST=255.255.255.255 LEN=379 TOS=0x10 PREC=0x00 TTL=128 ID=0
PROTO=UDP SPT=68 DPT=67 LEN=359
...
```

Related information

network firewall

network firewall logs

debug packetcable cops

Use the `debug packetcable cops` command to enable debugging processes for PacketCable with the COPS engine. To disable debugging, use the **no** form of this command.

```
debug packetcable cops
no debug packetcable cops
```

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

This command dumps all COPS messaging with the PDP to the console of the current user.

Examples

The following example enables PacketCable debugging:

```
debug packetcable cops
```

Related information

packetcable

debug packetcable gatecontrol

Use the `debug packetcable gatecontrol` command to enable and display debugging processes for PacketCable gatecontrol. To disable this debugging, use the **no** form of this command:

```
debug packetcable gatecontrol
no debug packetcable gatecontrol
```

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

This command dumps all PacketCable gatecontrol commands from the CMS/PS to the console of the current user.

Examples

The following example starts PacketCable gatecontrol debugging:

```
debug packetcable gatecontrol
```

Related information

packetcable

debug packetcable subscriber

Use the `debug packetcable subscriber` command to enable and display debugging processes for PacketCable subscribers. To disable this debugging, use the **no** form of this command:

```
debug packetcable subscriber subscrIP
no debug packetcable subscriber
```

Syntax description

`subscrIP`	The subscriber’s IP address.

Command mode

Exec mode.

Usage guidelines

This command dumps all messaging with CMS/PS, related to a single subscriber. SubcriberIP can be either a CM or a CPE IP address.

Example

The following example activates the debug packetcable subscriber command for the specified IP address:

```
debug packetcable subscriber 127.1.1.109
```

Related information

packetcable

debug system proto-throttle

Use the `debug system proto-throttle` command to display the packets that were throttled per specified protocol. Specifying no protocol parameter enables this capture on all protocols. The count is global.

`debug system proto-throttle` [{ `arp | dhcp | rip | igmp | nd | dhcpv6 | mld | total | other` }] *count <n>*

Syntax description

count <n>	Limits the number of displayed logged packets.

Default

The default count is 1.

Command mode

Config mode.

Usage guidelines

Re-issuing the command restarts the count.

Example

```
admin@CableOS> debug system proto-throttle
08:03:27.744527 1a:87:75:ff:7f:94 > 33:33:00:00:00:02, ethertype IPv6(0x86dd),
length 70: fe80::1887:75ff:feff:7f94 > ff02::2: ICMP6, router solicitation, length
 16
```

debug validation

Use the `debug validation` command to control CLI validation.

IMPORTANT: This command is for Harmonic personnel ONLY and should NOT be performed by customers!

`debug validation` [*disabled*|*enabled*]

Command mode

Exec mode.

Usage guidelines

IMPORTANT: This debug command is for Harmonic personnel ONLY and should NOT be performed by customers!

If a parameter is set, validation will be enabled or disabled. If no parameter is given, it will print the validation mode.

The command is active only for the active session in which it was executed.

docsis ping

Use the `docsis ping` command to determine whether a specific cable modem is reachable from the CMTS at the DOCSIS MAC layer.

`docsis ping` { *mac-addr* | *ip-addr* } [`us-chan` *us-chan*] [`repeat` *queue-intervals*] [`verbose`]

Syntax description

mac-addr	The 48-bit hardware (MAC) address of the CM. If you specify the MAC address of a CPE device, the command will resolve it to the MAC address of the CM servicing that CPE device and send the DOCSIS ping to the CM.

ip-addr	The IPv4 or IPv6 address of the CM. If you specify the IP address of a CPE device, the command will resolve it to the IP address of the CM servicing that CPE device and send the DOCSIS ping to the CM.
`us-chan` *us-chan*	(Optional). The name of a logical upstream channel. If not specified, the first available channel is used.
`repeat` *queue-intervals*	(Optional) Specifies the number of maintenance intervals for a queue. Valid values are from 1 to 2147483647. The default value is 5.
`verbose`	(Optional) Specifies verbose mode for the output, giving additional details about the packets transmitted and received.

Default

This command has no default value.

Command mode

Privileged EXEC mode

Usage guidelines

The `docsis ping` command allows a cable operator to quickly diagnose the health of a channel between the CMTS router and any particular DOCSIS cable CPE device. The `docsis ping` is similar in concept to the IP ping but uses the lower MAC layer instead of the datalink or transport layers. Using the MAC layer has the advantage that a DOCSIS ping can be used with CMs that have not yet acquired an IP address. This allows cable operators to ping CMs that were not able to complete registration or that were improperly configured at the IP layer.

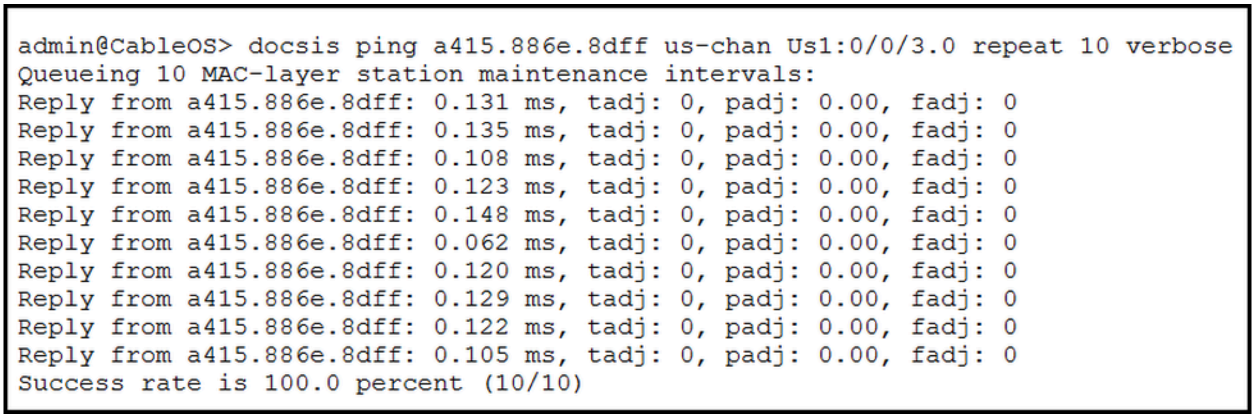
In addition to providing connectivity information, the `docsis ping`command provides a real-time view and plot of requested power adjustments, frequency, timing offset adjustments, and a measure of optimal headend reception power.

The pings are sent with a 200 millisecond interval. This is done to avoid sending multiple ranging requests during the T3 timeout.

It is possible to perform multiple `docsis ping` commands simultaneously from separate CLI shells. It is safe to do so if the target CMs are different. However, when the target CMs are the same (even when the command arguments are different), the possibility of a timeout is noticeably increased.

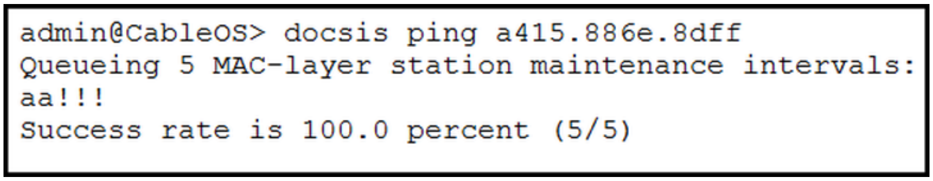
Examples

The example below shows the command using a specific Upstream channel, repeating the ping 10 times and printing the full output.



```
admin@CableOS> docsis ping a415.886e.8dff us-chan Us1:0/0/3.0 repeat 10 verbose
Queueing 10 MAC-layer station maintenance intervals:
Reply from a415.886e.8dff: 0.131 ms, tadj: 0, padj: 0.00, fadj: 0
Reply from a415.886e.8dff: 0.135 ms, tadj: 0, padj: 0.00, fadj: 0
Reply from a415.886e.8dff: 0.108 ms, tadj: 0, padj: 0.00, fadj: 0
Reply from a415.886e.8dff: 0.123 ms, tadj: 0, padj: 0.00, fadj: 0
Reply from a415.886e.8dff: 0.148 ms, tadj: 0, padj: 0.00, fadj: 0
Reply from a415.886e.8dff: 0.062 ms, tadj: 0, padj: 0.00, fadj: 0
Reply from a415.886e.8dff: 0.120 ms, tadj: 0, padj: 0.00, fadj: 0
Reply from a415.886e.8dff: 0.129 ms, tadj: 0, padj: 0.00, fadj: 0
Reply from a415.886e.8dff: 0.122 ms, tadj: 0, padj: 0.00, fadj: 0
Reply from a415.886e.8dff: 0.105 ms, tadj: 0, padj: 0.00, fadj: 0
Success rate is 100.0 percent (10/10)
```

The example below shows a simple command, using the command defaults.



```
admin@CableOS> docsis ping a415.886e.8dff
Queueing 5 MAC-layer station maintenance intervals:
aa!!!
Success rate is 100.0 percent (5/5)
```

Output columns

Field	Description
!	Indicates that a successful response was received from the ping request. This indicates that the CM is reachable from the CMTS and can respond to CMTS requests at the DOCSIS MAC layer.
.	Indicates that a DOCSIS ping request was sent out but that the ping request timed out without receiving a response. This indicates that the CM is having difficulties maintaining DOCSIS MAC layer connectivity to the CMTS. **NOTE:** If the `docsis ping` command displays a number of periods (.) along with exclamation points (!), it strongly indicates the presence of RF noise or physical cable and plant issues that are causing a loss of MAC layer connectivity.
a	Indicates that a response was received but that an adjustment of frequency, power, or timing was also made in the response. This indicates that although the upstream channel is functional, some sort of problem is forcing power averaging and other misreads of the upstream received power signals.
f	Indicates that the CMTS failed to send the DOCSIS ping request because the CM is offline, and therefore MAC-layer communication is not possible. This indicates that the CM had previously registered with the CMTS, but that at some point it stopped responding to the DOCSIS station maintenance messages and that the CMTS eventually marked the CM as offline. The CM might have lost power or might have been disconnected from the coaxial cable. **TIP:** Use the `show cable modem` command with the same MAC or IP address as you used with the `docsis ping` command to show the current status of this CM.

exit

Use the `exit` command to exit the current session.

`exit`

Syntax description

This command has no arguments or keywords.

Default

There is no default for this command.

Command mode

Exec mode and config mode.

Example

The following example exits from the current session in the CableOS Core:

```
exit
```

Related information

history

logout

quit

reboot

fault-management no-reboot-on-fault

Use the `fault-management no-reboot-on-fault` command to enable or disable rebooting of the server in case of a critical process crash.

`fault-management no-reboot-on-fault` *{disabled* | *enabled}*

Syntax description

`disabled`	The server will reboot itself in case of a critical process crash. This is the default.
`enabled`	The server will not reboot itself in case of a critical process crash. Do NOT use this option unless required by Harmonic.

Default

The default is *disabled*.

Command mode

Config mode.

Usage guidelines

Do NOT use the *enabled* option unless required by Harmonic.

fetch cable rpd tech-support

Use the `fetch cable rpd tech-support` command to fetch the tech-support tarball file from the RPD to the Core.

`fetch cable rpd` [*v-slot* | *rpd-ip* | *rpd-mac*] `tech-support`

Syntax description

v-slot	The virtual slot of the RPD in the format VC:VS
rpd-ip	The IP address of the RPD.
rpd-mac	The MAC address of the RPD.

Default

This command has no default value.

Command mode

Exec mode.

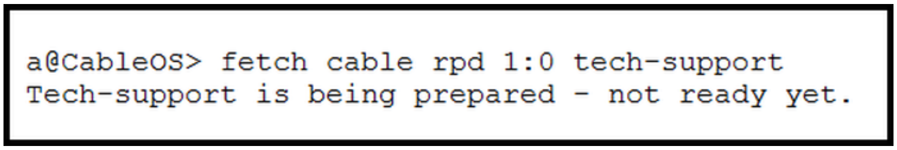
Usage guidelines

Before running this command, verify that:

- the tech-support file is ready to be fetched with the `get-status cable rpd tech-support` command
- the ssh service is enabled on the RPD
- the ssh public key from the Core is installed in the `.ssh/authorized_keys` file on the RPD

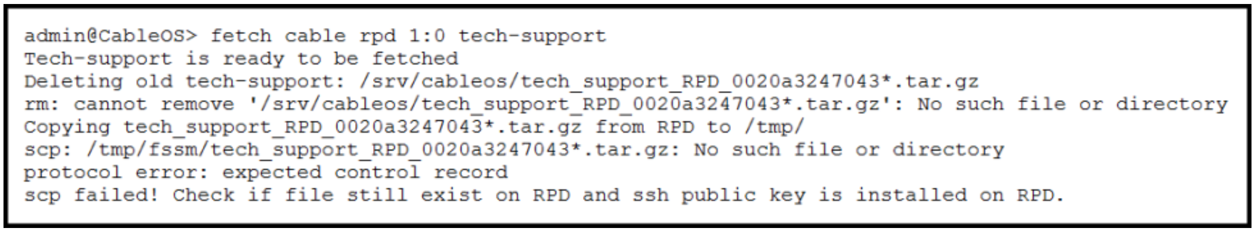
Examples

The following example shows a fetch command when the tech-support file is not yet ready:



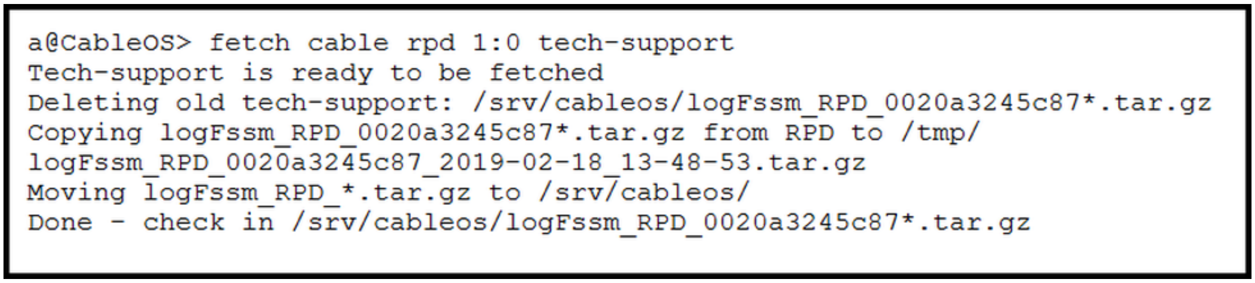
```
a@CableOS> fetch cable rpd 1:0 tech-support
Tech-support is being prepared - not ready yet.
```

The following example shows a fetch command when tech-support was deleted from the RPD after the prepare command had finished, but before the fetch command started:



```
admin@CableOS> fetch cable rpd 1:0 tech-support
Tech-support is ready to be fetched
Deleting old tech-support: /srv/cableos/tech_support_RPD_0020a3247043*.tar.gz
rm: cannot remove '/srv/cableos/tech_support_RPD_0020a3247043*.tar.gz': No such file or directory
Copying tech_support_RPD_0020a3247043*.tar.gz from RPD to /tmp/
scp: /tmp/fssm/tech_support_RPD_0020a3247043*.tar.gz: No such file or directory
protocol error: expected control record
scp failed! Check if file still exist on RPD and ssh public key is installed on RPD.
```

The following example shows a fetch command with the tech-support file fetched successfully:



```
a@CableOS> fetch cable rpd 1:0 tech-support
Tech-support is ready to be fetched
Deleting old tech-support: /srv/cableos/logFssm_RPD_0020a3245c87*.tar.gz
Copying logFssm_RPD_0020a3245c87*.tar.gz from RPD to /tmp/
logFssm_RPD_0020a3245c87_2019-02-18_13-48-53.tar.gz
Moving logFssm_RPD_*.tar.gz to /srv/cableos/
Done - check in /srv/cableos/logFssm_RPD_0020a3245c87*.tar.gz
```

Related information

get-status cable rpd tech-support

prepare cable rpd tech-support

generate csr

Use this command to generate a CSR (Certificate Signing Request) and private key from a CSR configuration file that has been prepared and installed in the CableOS Core server.

`generate csr` *csr config filename* [`common-name` *name*] [`name` *filename_to_be_generated*]

Syntax description

csr config filename	The name of the *.cnf file, stored in the CableOS Core server, used to generate the CSR to the LI IPSEC tunnel endpoint
common-name	[Optional] Used to override the common name provided in the .cnf file.
name	[Optional] Used to specify the file name to be generated. The filename is entered without an extension.

Default

This command has no default value.

Command mode

Exec configuration mode.

Usage guidelines

The command generates a certificate request and a private key.

The certificate and private key are stored in the CableOS Core server.

Running this command for <filename>.cnf generates <filename>.pem private key. This is an alternative to running the install certificate command for the same name <filename>.pem PK. Using this method ensures that the Private Key is always inside the CableOS server.

When the command is run with the `name` argument, <filename> could be overridden, and resulting CSRs might have unique names, regardless of the .cnf name.

The certificate that is generated from the CSR and will be installed using the install certificate command must use the same name as the generated private key (<filename>.pem).

Examples

The following example generates a CSR from a CSR config file stored in the CableOS Core server. The command is run without the (optional) common name argument. The example includes password creation because the configuration file has the `ChallengePassword` attribute:

```
generate csrconfigfile.cnf
```

```

Enter password: *********
Generating a RSA private key
................+++++
...............+++++
writing new private key to '/srv/cableos/private_keys/csrconfigfile.key'
-----
Generated successfully. Use following command to view CSR:

show csr csrconfigfile.csr [decode]
```

The following example generates a CSR from a CSR config file stored in the CableOS Core server. The example is run with a common name. The example includes password creation because the configuration file has the `ChallengePassword` attribute:

```
generate csrconfigfile.cnf common-name test
```

```

Override config: commonName: 'Default' -> 'test'
Temporary config created: /tmp/csrconfigfile.cnf.a0eih0_9
Enter password: *********
Generating a RSA private key
................+++++
...............+++++
writing new private key to '/srv/cableos/private_keys/csrconfigfile.key'
-----Generated successfully. Use following command to view CSR:

show csr csrconfigfile.csr [decode]
```

Related information

install csr config

show csr

get-status cable rpd tech-support

Use the `get-status cable rpd tech-support` command, to check if the tech-status preparation has completed.

`get-status cable rpd` [*v-slot* | *rpd-ip* | *rpd-mac*] `tech-support`

Syntax description

v-slot	The virtual slot of the RPD in the format VC:VS
rpd-ip	The IP address of the RPD.
rpd-mac	The MAC address of the RPD.

Default

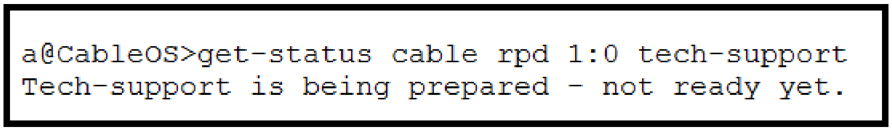
This command has no default value.

Command mode

Exec mode.

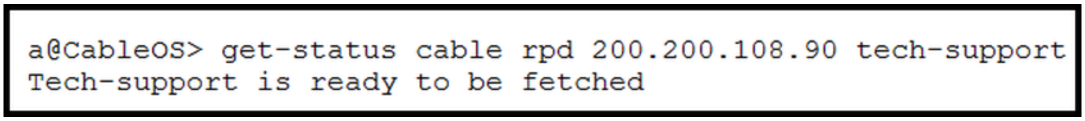
Examples

The following example shows that the request to prepare tech support for the RPD in slot 1:0 has not yet completed:



```
a@CableOS>get-status cable rpd 1:0 tech-support
Tech-support is being prepared - not ready yet.
```

The following example shows that the request to prepare tech support for the RPD at IP address 200.200.108.90 has completed:



```
a@CableOS> get-status cable rpd 200.200.108.90 tech-support
Tech-support is ready to be fetched
```

Related information

fetch cable rpd tech-support

prepare cable rpd tech-support

ha master move

Use the `ha master move` command to move the active CableOS manager to the specified destination server.

`ha master move` *servername*

Syntax description

`servername`	The name of the destination server.

Default

There is no default for this command.

Command mode

Exec mode.

Usage guidelines

The CableOS Manager is the component responsible for CLI, SNMP, and other configuration and management aspects of the system.

This command is usually only used in a testing scenario.

Examples

The following example moved the active CableOS manager to a server named cs022:

```
ha master move cs022
```

Related information

rebalance lcce

show cluster history

history

Use the `history` command to define how many entries in the history list of entered CLI commands to retain. To not retain any entries, use the **no** form of this command.

`history` *size*

`no history` *size*

Syntax description

size	The number of history entries to retain. Enter an integer between 1 and 1000.

Default

The default number of history entries is 1000.

Command mode

Exec mode.

Usage guidelines

When setting the number of entries to be retained in the history list of entered CLI commands, remember that the earliest entries are overwritten when the number of entries exceeds the set maximum.

Examples

The following example sets the number of history entries to be retained to 500:

```
history 500
```

Related information

exit
logout
quit
reboot

hostname

Use the `hostname` command to set a host-name that will be displayed in prompts and welcome banners. To remove the host-name, use the **no** form of the command.

`hostname` { *hostname* }
`no hostname`

Syntax description

`hostname`	The name of the hostname to be used.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

The purpose of this command is to provide backward compatibility and emulation of working with a system hostname.

In a cluster environment the real hostname of the station cannot be changed on will, so this command provides a mechanism to change an alias of the host-name. The alias will be displayed in ‘prompts’ and ‘welcome banners’ and maybe other CLI interface labels or messages where hostname is required, but it will not be involved in DNS or any other networking matters.

After changing the hostname, all places in welcome banners (the banner login and banner motd commands, token ‘$(hostname)’) and prompts (the cli prompt1 and cli prompt2 commands, tokens ‘\h’ and ‘\H’) will be changed in accordance with the new hostname.

After the no hostname command, all prompts and banners will return to the original system hostname.

Examples

The following example sets the host-name as MasterSystem01:

```
hostname MasterSystem01
```

Related information

banner

idle-timeout

Use the `idle-timeout` to set the timeout period for an SSH session that is inactive.

`idle-timeout` *seconds*

Syntax description

seconds	The timeout period in seconds. The valid range is from 0 - 8192 and the default value is 1800 (30 minutes).

Default

The default timeout period is 1800 seconds (30 minutes).

Command mode

Exec mode.

Usage guidelines

This command sets the amount of time that an SSH session can remain connected and inactive.

Examples

The example below sets the timeout period to 15 minutes (900 seconds).

```
idle-timeout 900
```

install

Use the `install` command to install software from an image file to a single node or to all nodes in the system.

`install` *filename*

Syntax description

`filename`	The name of the software image file

Command mode

Exec mode.

Usage guidelines

This command should be used to install a new version of the software.

The command also checks that the new installed release is compatible with the current startup-config which will be used after restart to passive partition. If the configuration schema was somehow changed and backward compatibility was broken, a message similar to the one below will be displayed.

```
The current startup-config is not compatible with the new release.
Execute 'copy startup-config passive all' to see the errors and fix them
 before reboot.
After the issues are fixed, execute 'reboot passive all' to continue.
```

Examples

The following example will install the software from the file `Cos-release-1.8.13.0.2+auto27.iso`:

```
install Cos-release-1.8.13.0.2+auto27.iso
```

Related information

reboot passive all
show images
show upgrade process
validate-iso-md5
show version
show version cluster-server
show version cluster-server all
show version cluster-nic
reboot passive hitless

install cable rpd

Use the `install cable rpd` command to start, stop, or monitor the software upgrade process on a Harmonic Remote Phy Device such as the Pebble.

```
install cable rpd {v-chassis:v-slot | rpd-mac-address | rpd-ip-address |{
filename | url}}
{start | stop | status | filename | url | background}
```

To upgrade multiple Remote Phy Devices, use the following command:

```
install cable rpd multiple rpd-list { inactive url | start url | activate } [
silence ]
```

Syntax description

`v-chassis:v-slot`	Selects the RPD configured with the `cable rpd v-chassis:v-slot` command.

`rpd-mac-address`	Selects the RPD configured with the `cable rpd ... mac-address rpd-mac-address` command.
`rpd-ip-address`	Selects the RPD connected with GCP via its IP address rpd-ip-address, as displayed with the `show cable rpd` command This address can be either an IPv4 address or an IPv6 address.
`filename`	Selects an .iso file currently stored on the CableOS Core as the source of the Exo-R image.
`url`	Selects a URL for an internet location that contains the .iso file of the Pebble image.
`start`	Starts the installation.
`stop`	Stops the installation.
`status`	Displays the status of a currently running installation process. The possible statuses are: • Upgrade in progress. • Upgrade failed - Max download retry exceed. • Upgrade failed - Server not present. • Upgrade failed - File not present. • Upgrade failed - TFTP max retry exceed. • Upgrade failed - Incompatible SW file. • Upgrade failed - SW file corruption. • Upgrade failed - Improper code file controls. • Upgrade failed - Code file manufacturer CVC validation failure. • Upgrade failed - Code file CVS validation failure. • Upgrade successful.
`background`	Installs the RPD version in the background.
`multiple`	Indicates the multiple upgrade mode.
rpd-list	Used for the upgrade of multiple RPDs, this is a list of the RPD devices, separated by commas without spaces. All the devices must be specified with the same type of identification.
`inactive`	Initiates the download of the upgrade files to the RPDs specified in the *rpd-list*.
`activate`	Runs the actual update of the RPDs specified in the *rpd-list*.
`silence`	Enables CableOS Sonar to perform mass upgrades for RPDs. If this keyword is used, the command will not ask for any approvals.

Command mode

Exec mode.

Usage guidelines

To run the download-verification-installation process the operator runs the following command:

```
install cable rpd multiple <rpd-list> inactive <url>
```

This command sends the corresponding SSD TLVs to the RPDs in the list.

Then the operator can check the installation process with the following command:

```
install cable status
```

The command will output upgrade statuses for all connected RPDs.

To upgrade the RPDs, run the following command:

```
install cable rpd multiple <rpd-list> start <url>
```

When the correct right SW image has been installed on all RPDs, at the planned maintenance window, the operator resets all the RPDs with the following command:

```
install cable rpd multiple <rpd-list> activate
```

The command restarts all the RPDs to the passive partition, where the SW image was installed previously by the inactive command.

Examples

The following example shows an upgrade to an RPD in slot 0 on chassis 2:

```
install cable rpd 2:0 start http://10.40.1.215/release-compose/nsg-run-
compose/compose/info/exor-device/RPD_PI11/1.7.0.0-3+auto23/results/ExoR-
release-1.7.0.0-3+auto23.iso.codefile
```

The following example shows the status of the upgrade being checked, together with the output of the check:

```
ccap@CableOS> install cable rpd status
rpd 2:0 : Upgrade in progress. (SW file: ExoR-
release-1.7.0.0-3+auto23.iso.codefile ) Tue Aug  7 13:40:09 2018
```

install certificate

Use this command to upload LI IPSEC certificates that provide for mutual identification between the CableOS server and the IPSEC tunnel endpoint, which can be, for example, a firewall or any device that can decrypt IPSEC tunnel traffic.

`install certificate` *certificate URI/URL location*

The supported file types are `.pem` or `.der`

`install certificate` *certificate URI/URL location* `PK`

NOTE: The PK file name must be the same as the certificate file name, including its file extension `.pem` or `.der`.

`install certificate` *certificate URI/URL location* `CA`

Syntax description

certificate URI/URL location	The location and file of the certificate to be uploaded **NOTE:** The absence of an additional keyword indicates to the CableOS Core server that this is the certificate public key and directs to load the file into the proper folder
PK	The keyword required to upload the PK (Private Key) file The PK file name must be the same as the certificate file name The PK keyword directs the CableOS Core server to install the PK into the proper folder
CA	The keyword required to upload the CA (Certificate Authority) file The CA keyword directs the CableOS Core server to install the CA into the proper folder

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

CableOS supports DER and PEM certificates.

Only one Certificate + PK (Private Key) is required for both servers in the CableOS cluster for establishing independent and parallel IPSEC tunnels. That is, IPSEC tunnels are established on both nodes of a cluster, regardless of the HA node status. The certificates are applied to each node in the cluster.

Three certificate files must be uploaded to the CableOS Core server, each using a separate CLI command:

- Certificate itself
- PK (Private Key)
- CA (Certificate Authority)

The system performs validation for the proper certificate/PK file installations; an incorrect file is rejected.

The following protocols are supported for uploading certificate files: HTTP, HTTPS, FTP, TFTP, SFTP and SCP.

Examples

```
user@CoreID(config)#  install certificate http://urlsite/urlfolder/Cert1234.pem
```

```
user@CoreID(config)#  install certificate http://urlsite/urlfolder/Cert1234.pem PK
```

```
user@CoreID(config)#  install certificate http://urlsite/urlfolder/Cert4567.der CA
```

install csr config

Use this command to install a CSR (Certificate Signing Request) configuration file in the CableOS Core server; this file is later used to generate the CSR file.

`install csr config` *config file URL location/filename*

Syntax description

config file URL location/ filename	The URL location and the CSR configuration file to be uploaded. For example, http://200.100.10.10/~myuser/ cableos1.cnf or http://myserver/~myuser/cableos1.cnf **NOTE:** The absence of an additional keyword indicates to the CableOS Core server to load the file into the proper folder

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

The CSR configuration file is of standard format. The following is an example of what the file should look like:

```

[ req ]
default_bits        = 2048
default_md          = sha512
default_keyfile     = key.pem
prompt              = no
encrypt_key         = no
distinguished_name = req_distinguished_name

[ req_distinguished_name ]
countryName             = "UK"                      # C=
stateOrProvinceName     = "CountyDell"              # ST=
localityName           = "MyTown"                 # L=
organizationName       = "MyMedia"                # O=
organizationalUnitName = "Unit1"                  # OU=
commonName             = "Default"                # CN=
emailAddress           = "myemail@company.com"    # CN/emailAddress=
```

NOTE: The first and last characters within the square brackets should **always** be spaces.

Examples

The following example installs the target pre-prepared config file `csrconfigfile.cnf`, which is located at the url `http://servereuro/`..., into the `/srv/cableos/csr_config/` directory of the CableOS Core server:

```
install csr config http://serveuro/~userjohn/confstorage/csrconfigfile.cnf
```

```
Enter config filename [csrconfigfile.cnf]: csrconfigfile.cnf
 or <Enter> for default
Config will be saved to: /srv/cableos/csr_config/csrconfigfile.cnf
Installed sucessfully.
```

Related information

generate csr

show csr

interface module/olt

Use the `interface` commands to configure a VxLAN from the Core.

`interface module` *vc:vs* `tunnel-config` { `other` | `gcp` }
`interface olt` *vc:vs* { *pp* } `tunnel-mgmt vxlan src-ip` *tunnel-mgmt vxlan src-ip* `gateway` *tunnel-mgmt vxlan gateway-ip* `peer-ip` *tunnel-mgmt vxlan peer-ip* `vni` *tunnel-mgmt vni* `tunnel-data vxlan src-ip` *tunnel-data vxlan src-ip* `gateway` *tunnel-data vxlan gateway-ip* `peer-ip` *tunnel-data vxlan peer-ip* `vni` *tunnel-data vni* `s-tag` *s-tag*

To remove a VxLAN configuration, use the following:

`no interface olt` *vc:vs* { *pp* }
`no interface module` *vc:vs*

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
pp	The SFP port of the RPD. Use either port 2 or port 3.

`{other|gcp}`	The type of tunnel to be configured.
tunnel-mgmt vxlan src-ip	The Core IP address for the management tunnel. The address can be either IPv4 or IPv6.
tunnel-mgmt vxlan gateway-ip	The Gateway IP address for the management tunnel. The address can be either IPv4 or IPv6.
tunnel-mgmt vxlan peer-ip	The RPD IP address for the management tunnel. The address can be either IPv4 or IPv6.
tunnel-mgmt vni	The VxLAN network identifier for the management tunnel. The valid range is 1 - 16777215.
tunnel-data vxlan src-ip	The Core IP address for the data tunnel. The address can be either IPv4 or IPv6.
tunnel-data vxlan gateway-ip	The Gateway IP address for the data tunnel. The address can be either IPv4 or IPv6.
tunnel-data vxlan peer-ip	The RPD IP address for the data tunnel. The address can be either IPv4 or IPv6.
tunnel-data vni	The VxLAN network identifier for the data tunnel.The valid range is 1 - 16777215.
s-tag	The VLAN tag to be added by OLT to identify traffic from this interface. Valid range is 0 … 4094

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

When defining the VxLAN from the Core, two tunnels are defined, one for control and one for data.

Examples

The following is an example configuration:

```
interface module 10:0
   tunnel-config gcp
!
interface olt 10:0/3
 type        tibit-microplug
 fw-version  R2.0.0
 tunnel-mgmt vxlan src-ip 7.7.230.139/24 gateway 7.7.230.1 peer-ip 200.200.231.2 vni
 20235
 admin-state up
 pon 1
  mode                 xgs
  tunnel-data vxlan src-ip 200.200.230.109/24 gateway 200.200.230.1 peer-ip
 200.200.231.2 vni 22039 dsi-vlan 2230
  admin-state           up
  s-tag                 1000
  provisioning-template single_sf_be
 !
  !
```

The following example removes the configuration:

```
no interface olt 10:0/3
no interface module 10:0
```

ipdr associate

Use the `ipdr associate` command to associate the IPDR Collector with a session. To remove the association, use the **no** form of this command.

`ipdr associate` *session_id collector_name priority*
`no ipdr associate` *session_id collector_name* [*priority*]

NOTE:

IPDR configuration changes take effect only when the IPDR exporter transitions from disabled to enabled. When making any change to the `ipdr associate`, `ipdr collector`, `ipdr session`, or `ipdr template` commands, or the *act-timeout-secs*, *keep-alive-secs*, or *max-unacked* parameters of the `ipdr exporter` command, while `ipdr export enable` is already configured, you must run the following command sequence to have the change become operational:

```
ipdr exporter disabled
commit
ipdr exporter enabled
commit
```

IMPORTANT: For CableOS Cloud-Native Version 3.13.X and earlier only, after disabling the IPDR exporter, the operator must wait at least 20 seconds between commits, otherwise, the IPDR exporter will not restart.

Syntax description

session_id	An integer representing the unique IPDR session ID. The valid range is 1 - 65535.
collector_name	The Collector name. Enter a string of between 1 - 16 characters.
priority	Integer 1..10 The priority value between the session and the Collector. A value of 1 indicates the highest priority.

Command mode

Config mode.

Usage guidelines

NOTE: The CMTS will not establish IPDR connections with IPDR collectors which are not associated with at least one enabled session.

Example

The following example associates Session 1 with Collector ipdr_collector_1 with the highest priority.

```
ipdr associate 1 ipdr_collector_1 1
```

Related information

ipdr collector
ipdr exporter
ipdr session
ipdr template
ipdr type
show ipdr collector
show ipdr exporter
show ipdr session

ipdr collector

Use the `ipdr collector` command to configure the Internet Protocol Detail Record (IPDR) Collector to receive information by defining the name and IP address of the Collector that can be used. To remove the Collector, use the **no** form of this command.

`ipdr collector` *collector_name ip_addr*
`no ipdr collector` *collector_name ip_addr*

NOTE:

IPDR configuration changes take effect only when the IPDR exporter transitions from disabled to enabled. When making any change to the `ipdr associate`, `ipdr collector`, `ipdr session`, or `ipdr template` commands, or the *act-timeout-secs*, *keep-alive-secs*, or *max-unacked* parameters of the `ipdr exporter` command, while `ipdr export enable` is already configured, you must run the following command sequence to have the change become operational:

```
ipdr exporter disabled
commit
ipdr exporter enabled
commit
```

IMPORTANT: For CableOS Cloud-Native Version 3.13.X and earlier only, after disabling the IPDR exporter, the operator must wait at least 20 seconds between commits, otherwise, the IPDR exporter will not restart.

Syntax description

collector_name	The Collector name.
ip-addr	The IP address of the IPDR Collector. Both IPv4 and IPv6 addresses are allowed.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

You can use the `show ipdr collector` command to display IPDR diagnostic events. The table below shows supported events with their corresponding IPDR/SP events and IDs.

Event	IPDR/SP Message	ID
IPDR_EVENT_COLLECTOR_CONNECTED	CONNECT	0x05
IPDR_EVENT_SERVER_CONNECTED	CONNECT_RESPONSE	0x06
IPDR_EVENT_DISCONNECT	DISCONNECT	0x07
IPDR_EVENT_FLOW_START	FLOW_START	0x01
IPDR_EVENT_FLOW_STOP	FLOW_STOP	0x03
IPDR_EVENT_SESSION_START	SESSION_START	0x08
IPDR_EVENT_SESSION_STOP	SESSION_STOP	0x09
IPDR_EVENT_KEEP_ALIVE	KEEP_ALIVE	0x40
IPDR_EVENT_TEMPLATE_DATA	TEMPLATE_DATA	0x10
IPDR_EVENT_MODIFY_TEMPLATE	MODIFY_TEMPLATE	0x1a
IPDR_EVENT_MODIFY_TEMPLATE_RESPONSE	MODIFY_TEMPLATE_RESPONSE	0x1b
IPDR_EVENT_FINAL_TEMPLATE_DATA_ACK	FINAL_TEMPLATE_DATA_ACK	0x13
IPDR_EVENT_START_NEGOTIATION	START_NEGOTIATION	0x1d
IPDR_EVENT_START_NEGOTIATION_REJECT	START_NEGOTIATION_REJECT	0x1e
IPDR_EVENT_GET_SESSIONS	GET_SESSIONS	0x14
IPDR_EVENT_GET_SESSIONS_RESPONSE	GET_SESSIONS_RESPONSE	0x15
IPDR_EVENT_GET_TEMPLATES	GET_TEMPLATES	0x16
IPDR_EVENT_GET_TEMPLATES_RESPONSE	GET_TEMPLATES_RESPONSE	0x17
IPDR_EVENT_DATA	DATA	0x20
IPDR_EVENT_DATA_ACK	DATA_ACK	0x21

Event	IPDR/SP Message	ID
IPDR_EVENT_REQUEST	REQUEST	0x30
IPDR_EVENT_RESPONSE	RESPONSE	0x31
IPDR_EVENT_ERROR	ERROR	0x23

These events also have an indication of their origin: INCOMING (from the CMTS to the Collector) and OUTGOING (from the Collector to the CMTS).

Diagnostic events are also recorded in the log file (**/var/log/cosmipdrexporterd** or show log local <node> cosmipdrexporterd). All events have severity INFO, except DATA/DATA_ACK messages (severity DEBUG to prevent flooding) and ERROR (severity ERROR). By default, IPDR log messages with severity INFO and higher are forwarded to Syslog.

Severity thresholds in the log file can be adjusted by issuing the CLI command `unhide debug` followed by the `logging local <node> cosmipdrexporterd <params>` command.

Severity thresholds in the terminal and remote syslog server can be adjusted via configuration entries in the *logging monitor* and *logging syslog* commands respectively.

NOTE: The CMTS will not establish IPDR connections with IPDR collectors which are not associated with at least one enabled session.

NOTE: CN CableOS uses an in-band address (specified under "system management ip-address") as the source address for IPDR traffic.

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Example

The following example defines Collector ipdr_collector_1 with an IPv4 address of 10.21.99.4.

```
ipdr collector ipdr_collector_1 10.21.99.4
```

Related information

ipdr associate

ipdr exporter

ipdr session

ipdr template

ipdr type

show ipdr collector

show ipdr exporter

show ipdr session

ipdr exporter

Use the `ipdr exporter` command to enable the CMTS application and start the Internet Protocol Detail Record (IPDR) Exporter process to connect the Exporter and the Collector. To terminate the connection between the Exporter and Collector, use the **disabled** form of this command.

`ipdr exporter` { `enabled | disabled` } [`ack-timeout` *ack-timeout-secs*] [`keep-alive` *timer-secs*] [`max-unacked` *record_num*] [`connection {` *accept* `|` *initiate* `} ]`

To restore the factory default for any parameter, use the **no** form of this command.

`no ipdr exporter` { `enabled | disabled` } [`ack-timeout` *ack-timeout-secs*] [`keep-alive` *timer-secs*] [`max-unacked` *record_num*] [`connection {` *accept* `|` *initiate* `} ]`

NOTE:

IPDR configuration changes take effect only when the IPDR exporter transitions from disabled to enabled. When making any change to the `ipdr associate`, `ipdr collector`, `ipdr session`, or `ipdr template` commands, or the *act-timeout-secs*, *keep-alive-secs*, or *max-unacked* parameters of the `ipdr exporter` command, while `ipdr export enable` is already configured, you must run the following command sequence to have the change become operational:

```
ipdr exporter disabled
commit
ipdr exporter enabled
commit
```

IMPORTANT: For CableOS Cloud-Native Version 3.13.X and earlier only, after disabling the IPDR exporter, the operator must wait at least 20 seconds between commits, otherwise, the IPDR exporter will not restart.

Syntax description

`disabled`	Disables the connection between the Exporter and the Collector.
`enabled`	Enables the connection between the Exporter and the Collector.
`ack-timeout-secs`	Optional, range 5..60, default 60 Acknowledged records timeout in seconds. `"no ipdr exporter ack-timeout"` will restore the default.
`keep-alive-secs`	Optional, range 5..300, default 300 Keepalive timer in seconds.
`max-unacked`	Optional, range 5..200, default 200 Maximum number of unacknowledged records.

`connection`	Optional, the default value is **accept**. The valid values are: • *accept* - accepts connection requests from the addresses provided in the `ipdr collector` config, and rejects all others. The Exporter listens on TCP port 4737. • *initiate* - periodically initiates connections to the addresses provided in the `ipdr collector` config. The Exporter connects to the Collector's TCP port 4737.

Default

By default, the connection is disabled.

Command mode

Config mode.

Usage guidelines

Example

The following example enables the Exporter.

```
ipdr exporter enabled
```

Related information

ipdr associate
ipdr collector
ipdr session
ipdr template
ipdr type
show ipdr collector
show ipdr exporter
show ipdr session

ipdr session

Use the `ipdr session` command to configure the name of an IPDR session. To remove an IPDR session, use the **no** form of this command.

`ipdr session` *session_id session_name session_descr*
`no ipdr session` *session_id* [*session_name session_descr*]

NOTE:

IPDR configuration changes take effect only when the IPDR exporter transitions from disabled to enabled. When making any change to the `ipdr associate`, `ipdr collector`, `ipdr session`, or `ipdr template` commands, or the *act-timeout-secs*, *keep-alive-secs*, or *max-unacked* parameters of the `ipdr exporter` command, while `ipdr export enable` is already configured, you must run the following command sequence to have the change become operational:

```
ipdr exporter disabled
commit
ipdr exporter enabled
commit
```

IMPORTANT: For CableOS Cloud-Native Version 3.13.X and earlier only, after disabling the IPDR exporter, the operator must wait at least 20 seconds between commits, otherwise, the IPDR exporter will not restart.

Syntax description

session_id	An integer representing the unique IPDR session ID. The valid range is 1 - 65535.
session_name	The session name. From 1 - 16 characters, with no spaces.
session_descr	The description of the session. From 1 - 32 characters, with embedded spaces enclosed within double quotation marks.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

NOTE: The CMTS will not establish IPDR connections with IPDR collectors which are not associated with at least one enabled session.

Example

The following example defines a Session whose ID is 1, whose name is ipdr-d3 and with a description “IPDR D3”.

```
ipdr session 1 ipdr-d3 “IPDR D3”
```

Related information

ipdr associate

ipdr collector

ipdr exporter
ipdr template
ipdr type
show ipdr collector
show ipdr exporter
show ipdr session

ipdr template

Use the `ipdr template` command to specify the Internet Protocol Detail Record (IPDR) template for an IPDR session on the CableOS Core. To restore the default template for a session, use the **no** form of this command.

`ipdr template session-id template-name`

NOTE:

IPDR configuration changes take effect only when the IPDR exporter transitions from disabled to enabled. When making any change to the `ipdr associate`, `ipdr collector`, `ipdr session`, or `ipdr template` commands, or the *act-timeout-secs*, *keep-alive-secs*, or *max-unacked* parameters of the `ipdr exporter` command, while `ipdr export enable` is already configured, you must run the following command sequence to have the change become operational:

```
ipdr exporter disabled
commit
ipdr exporter enabled
commit
```

IMPORTANT: For CableOS Cloud-Native Version 3.13.X and earlier only, after disabling the IPDR exporter, the operator must wait at least 20 seconds between commits, otherwise, the IPDR exporter will not restart.

Syntax description

`session_id`	An integer representing the unique IPDR session ID.

`template-name`	The template name. CableOS Core supports only the following template names: • DOCSIS-CMTS-CM-REG-STATUS-TYPE is an IPDR Service Definition schema that defines the Registration status of the CM as perceived by the CMTS. Supported version: 3.5.1-A.1 • DOCSIS-CMTS-CM-SERVICE-FLOW-TYPE is an IPDR Service Definition schema defining details of service flows. Supported version: 3.5.1-A.1 • DOCSIS-CMTS-CM-US-STATS-TYPE is an IPDR Service Definition Schema that defines the Upstream Channel statistics. Supported version: 3.5.1-A.2 • DOCSIS-CMTS-DS-UTIL-STATS-TYPE is an IPDR Service Definition Schema that defines downstream utilization statistics for a specified downstream interface for the specified CMTS. Supported version: 3.5.1-A.1 • DOCSIS-CMTS-TOPOLOGY-TYPE is an IPDR Service Definition Schema that defines the RF topology information that shows the connectivities of downstream and upstream channels to the fiber nodes within the CMTS. Supported version: 3.5.1-A.1 • DOCSIS-CMTS-US-UTIL-STATS-TYPE is an IPDR Service Definition Schema that defines upstream utilization statistics for a specified upstream logical channel interface for the specified CMTS. Supported version: 3.5.1-A.1 • DOCSIS-CMTS-CM-DS-OFDM-PROFILE-STATUS-TYPE is an IPDR Service Definition Schema that provides data on the status of each CM's OFDM Downstream Channel Profiles. Supported version: 3.5.1-B.1 • DOCSIS-CMTS-CM-DS-OFDM-STATUS-TYPE is an IPDR Service Definition Schema for monitoring the OFDM downstream channel status of the CM as perceived by the CMTS. Supported version: 3.5.1-B.1 • DOCSIS-DS-OFDM-PROFILE-STATS-TYPE is an IPDR Service Definition Schema that provides statistics on OFDM Downstream Profiles. Supported version: 3.5.1-B.1 • DOCSIS-US-OFDMA-PROFILE-STATS-TYPE is an IPDR Service Definition Schema that provides statistics on OFDMA Upstream Profiles. Supported version: 3.5.1-B.1 • DOCSIS-CMTS-CM-US-OFDMA-STATUS-TYPE is an IPDR Service Definition Schema for monitoring the OFDMA upstream channel status of the CM as perceived by the CMTS. Supported version: 3.5.1-B.1 • DOCSIS-CMTS-CM-US-OFDMA-PROFILE-STATUS-TYPE is an IPDR Service Definition Schema that provides data on the status of each CM's OFDMA Upstream Channel Profiles. Supported version: 3.5.1-B.1 and truncated 3.5.1-B.1 (with the ProfileCounterDiscontinuityTime field removed for compatibility with some legacy systems) • DOCSIS-CPE-TYPE is an IPDR Service Definition schema defining the Customer Premise Equipment (CPE) Type IPDR data record. Supported version: 3.5.1-A.2 • DOCSIS-SAMIS-TYPE-1 is an IPDR Service Definition schema defining the Subscriber Account Management (SAMIS) Type 1 IPDR data record. Supported version: 3.5.1-A.1

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

See the descriptions in the Syntax description for usage guidelines.

! **IMPORTANT:** For CableOS Cloud-Native Version 3.13.X and earlier only, after disabling the IPDR exporter, the operator must wait at least 20 seconds between commits, otherwise, the IPDR exporter will not restart.

Example

The following example associates Session 1 with a template called SAMIS-TYPE1.

```
ipdr template 1 SAMIS-TYPE1
```

Related information

ipdr associate
ipdr collector
ipdr exporter
ipdr session
ipdr type
show ipdr collector
show ipdr exporter
show ipdr session

ipdr type

Use the `ipdr type` command to configure the session type and interval at which the CableOS Core sends IPDR documents during time-event sessions. To reset the session type to the default time-interval of 15 minutes, use the **no** form of this command.

```
ipdr type session_id [ { time-interval minutes | ad-hoc | event } ]
no ipdr type session_id [ time-interval minutes ]
```

NOTE:

IPDR configuration changes take effect only when the IPDR exporter transitions from disabled to enabled. When making any change to the `ipdr associate`, `ipdr collector`, `ipdr session`, `ipdr type`, or `ipdr template` commands, or the *act-timeout-secs*, *keep-alive-secs*, or *max-unacked* parameters of the `ipdr exporter` command, while `ipdr export enable` is already configured, you must run the following command sequence to have the change become operational:

```
ipdr exporter disabled
commit
ipdr exporter enabled
commit
```

IMPORTANT: For CableOS Cloud-Native Version 3.13.X and earlier only, after disabling the IPDR exporter, the operator must wait at least 20 seconds between commits, otherwise, the IPDR exporter will not restart.

Syntax description

session_id	An integer representing the unique IPDR session ID.
`time-interval`*minutes*	The time interval in minutes for sending IPDR messages. The exporter follows a schedule based session to stream data on a periodic time interval. The valid range is from 5 - 1440. The default value is 15 minutes.
`ad-hoc`	Per request (from a Collector), the Exporter creates a session and closes it when either the data is streamed or a closing command is generated.
`event`	During the time the IPDR session is open the exporter can stream records at any time.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

See the descriptions in the Syntax description for usage guidelines.

Examples

The following example sets the message sending time interval for Session 1 to 10 minutes.

```
ipdr type 1 time-interval 10
```

Related information

ipdr associate

ipdr collector

ipdr exporter
ipdr session
ipdr template
show ipdr collector
show ipdr exporter
show ipdr session

logging buffered

Syslog can be configured to forward log messages to the circular buffered log file. Use the `logging buffered` command to configure the severity threshold, and optionally the size of the log file. To restore the default settings, use the **no** form of this command.

`logging buffered severity` *severity* [`size-mb` *size-mb*]
`no logging buffered`

Syntax description

severity	The Syslog severity threshold.
size-mb	The size (in megabytes) of the log file.

Default

The default size of the log file is 10 MB, and the default severity is error.

Command mode

Config mode.

Usage guidelines

Use this command to ensure that the correct information is logged and is not overwritten before it may be needed.

Examples

The following example logs messages with a severity of information and higher to a log file whose maximum size is 25 MB.

```
logging buffered severity information size-mb 25
```

For more information about logging message severity, see *Logging*.

Related information
show log

logging evt

Use the `logging evt` command to configure events to log.

`logging evt` *event id* `active` { `enabled` | `disabled` } `destination` { `c` | `l` | `s` }

Syntax description

event id	The ID of the event to be logged.
`active`	Enabled activates logging of the event, disabled deactivates logging of the event.
`destination`	The possible destinations are c(console), l(local log), s(syslog). To enter more than one destination, enter a string of all the destinations in any order. For example, to define a destination of Console and Syslog, enter `destination cs`

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

Event IDs are listed as follows:

1024	Cold Start
1026	Link Up
1027	Link Down
1028	Cable Modem Online
1029	Cable Modem Online
1030	User Added
1031	User Deleted
1032	AAA Service Error
1033	RPD Online
1034	RPD Offline
1035	RPD Connect Timeout
1043	IP address conflict detected on NSI provisioning interface
1044	NSI provisioning interface failed to obtain an IP address
1045	Event triggered on Core state change
1046	Node left cluster

1047	Node joined cluster
1048	CRC Error State changed
1060	RPD configuration/capabilities mismatch
1061	RPD configuration/capabilities become valid
1062	PTP failed to sync before timeout
1063	GCP connected
1064	GCP disconnected
1065	GM synchronized
1066	GM lost synchronization
1067	System Clock changed
1068	DOCSIS Event occurred
1069	System MTU change
1070	MD address OUI change
2002	RPD SSH login
2003	RPD SSH logout
2005	Total RPD CPU utilization
2006	Total RPD memory utilization
2020	RPD Configuration changed
2024	RPD DS RF port state changed
2025	Config topology changed
2026	RPD DS channel state changed
2028	RPD DS OFDM channel state changed
2030	No traffic on input channel
2032	CRC error alarm on RPD
2033	Power Level Failure
2034	RPN Power Status changed
2050	SFP Link UP
2051	SFP Link DOWN

Examples

The following example defines that log messages for an SFP Link Up event should be sent to the Console and the Syslog:

```
logging evt 2050 active enabled destination cl
```

logging local

Use the `logging local` command to configure the logging severity for a specific service.

`logging local` *hostname service-name* `severity` *severity*

Syntax description

hostname	The hostname of the cluster server where the service is running.
service-name	The name of the service. Different cluster servers may run different list of services.
severity	The logging severity. Only messages with equal and higher severities are passed.

Default

The default severity level is **error**.

Command mode

Config mode.

Usage guidelines

This command enables you to set different severity levels for different services as opposed to one global severity level.

This command permits subsets of log messages, identified by a service-name, to be configured with different severity thresholds for logging.

Examples

The following example sets the logging severity to information for service cosmsnmpd on cluster server node-1:

```
logging local node-1 cosmsnmpd severity information
```

For more information about logging message severity, see *Logging*.

Related information

show log

logging monitor

Syslog can be configured to forward log messages to the console asynchronously. Use the `logging monitor` command to configure the severity threshold. To disable log forwarding, use the **no** form of this command.

`logging monitor severity` *severity*
`no logging monitor`

Syntax description

severity	The Syslog severity threshold.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

Use this command to define the severity of messages sent to the console.

Examples

The following example will send all information with a severity of critical and higher:

```
logging monitor severity critical
```

For more information about logging message severity, see *Logging*.

Related information

show log
start logging monitor
stop logging monitor

logging syslog

Syslog can be configured to forward log messages to a remote Syslog server. Use the `logging syslog` command to configure the protocol, port, and severity threshold. To disable log forwarding, use the **no** form of this command.

```
logging syslog{ip-address  | domain-name}[control][port][severity severity]
no logging syslog
```

Syntax description

`control`	Protocol TCP or UDP. The default is tcp.
`port`	TCP/UDP port. The range is from 0 to 65535. The default is 514.
`ip-address`	The IP address of the Syslog server.
`domain name`	The domain name of the Syslog server.
`severity`	The Syslog severity threshold. The default is *notice*.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

Use this command to define the severity level for messages to be sent to a remote Syslog server.

For more information about logging message severity, see *Logging*.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Example

The following example will forward messages with a severity of error and higher to a server called fallback:

```
logging syslog fallback severity error
```

Related information

show log

start logging monitor

stop logging monitor

logout

Use the `logout` command to logout either an individual session or to logout a user from all the user's sessions.

`logout session` *id* `logout user` *user*

Syntax description

id	The id of the session to logout.
user	The user to logout from all user sessions.

Command mode

Exec mode.

User Guidelines

If no parameter is specified it will terminate the current session.

Examples

The following example will logout all active sessions for user tech01:

```
logout user tech01
```

Related information

exit
history
quit
reboot

move down-channel

Use the `move down-channel` to change the frequencies of a series of down-channels by some frequency offset.

`move down-channel` [`first-channel`] [`frequency-offset-mhz`] [*last-channel*]

NOTE: The command will only move existing (configured) channels and will not configure any new ones. The command changes the actual channel frequency configuration in the running config.

Syntax description

Field	Description
last-channel	The last channel index of the channels. Optional. Format [dsVC:VS/PP/C]
`frequency-offset-mhz`	The frequency offset to move all series of channels by *. *Note: The channel frequency range is 57.0-999.0 Mandatory. A positive or negative decimal number to 3 digits accuracy.
`first-channel`	The first channel index of the channels. Mandatory. Format [dsVC:VS/PP/C]

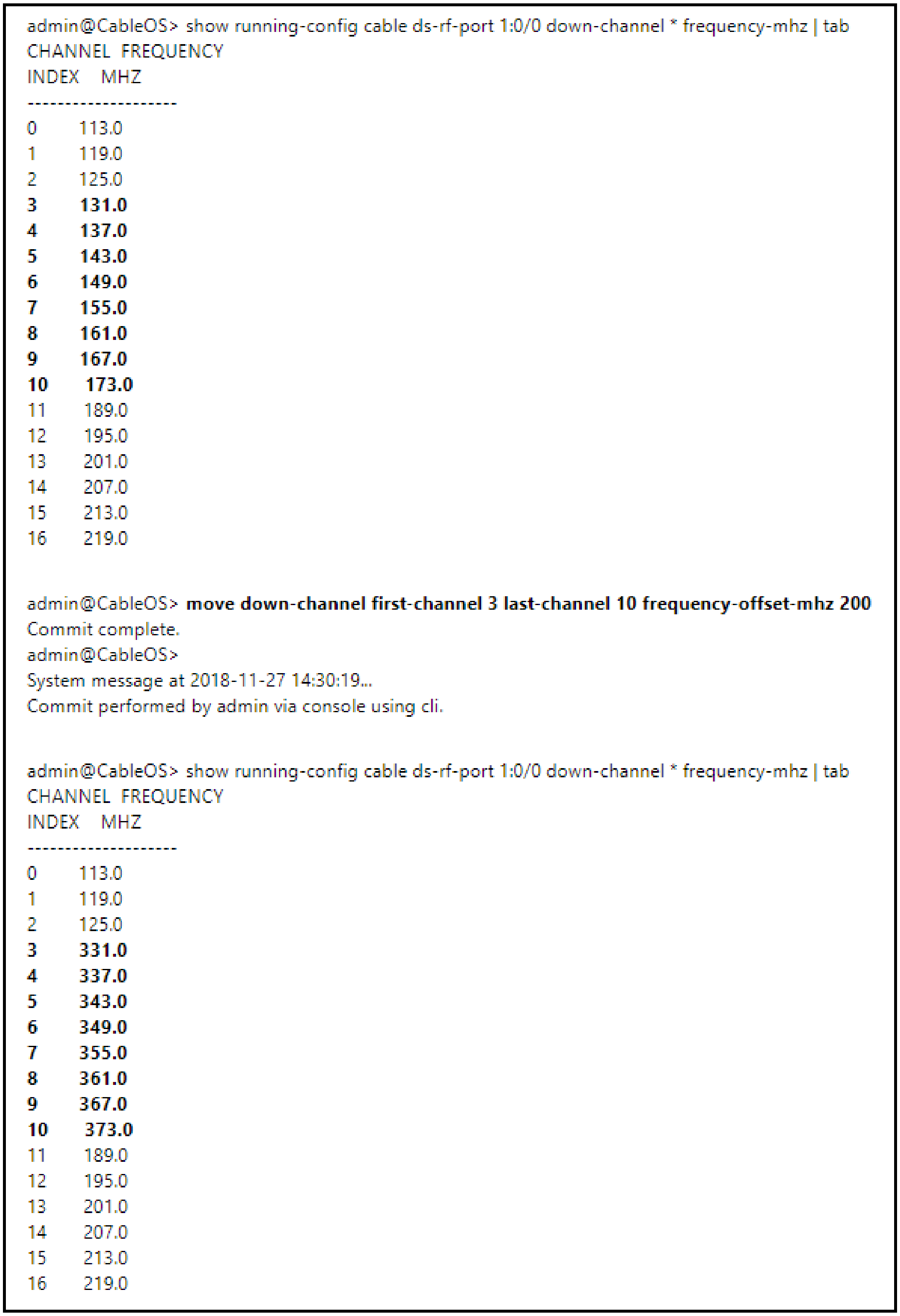
Command mode

Exec mode.

Usage guidelines

See the descriptions in the Syntax description for usage guidelines.

Examples



```
admin@CableOS> show running-config cable ds-rf-port 1:0/0 down-channel * frequency-mhz | tab
CHANNEL  FREQUENCY
INDEX    MHZ
--------------------
0        113.0
1        119.0
2        125.0
3        131.0
4        137.0
5        143.0
6        149.0
7        155.0
8        161.0
9        167.0
10       173.0
11       189.0
12       195.0
13       201.0
14       207.0
15       213.0
16       219.0

admin@CableOS> move down-channel first-channel 3 last-channel 10 frequency-offset-mhz 200
Commit complete.
admin@CableOS>
System message at 2018-11-27 14:30:19...
Commit performed by admin via console using cli.

admin@CableOS> show running-config cable ds-rf-port 1:0/0 down-channel * frequency-mhz | tab
CHANNEL  FREQUENCY
INDEX    MHZ
--------------------
0        113.0
1        119.0
2        125.0
3        331.0
4        337.0
5        343.0
6        349.0
7        355.0
8        361.0
9        367.0
10       373.0
11       189.0
12       195.0
13       201.0
14       207.0
15       213.0
16       219.0
```

network firewall

Use the `network firewall` command to enable or disable the Core firewall.

`network firewall` [*enabled* | *disabled*]

Syntax description

enabled	Enable the firewall on all COS Core nodes.
disabled	Disable the firewall on all COS Core nodes.

Default

The default for the command is enabled.

Command mode

Privileged Config mode

Usage guidelines

When CableOS is installed for the very first time, the firewall will be enabled.

Examples

The example below enables the firewall

```
network firewall enabled
```

Related information

debug log firewall dropped

network firewall logs

network firewall logs

Use the `network firewall` command to enable or disable the Core firewall.

`network firewall logs` [*enabled* | *disabled*]

Syntax description

enabled	Enable the firewall logs on all COS Core nodes.
disabled	Disable the firewall logs on all COS Core nodes.

Default

The default for the command is enabled.

Command mode

Privileged Config mode

Usage guidelines

When enabled, for every dropped or rejected package by the firewall, a message will be added to the kernel messages.

Examples

The example below enables the firewall logs

```
network firewall logs enabled
```

Related information

debug log firewall dropped

network firewall

network ntp-server

To configure the address of a Network Time Protocol server from which the CableOS Core obtains the local time of day, use the `network ntp-server` command. To disable all NTP client operations, use the **no** form of the command.

```
network ntp-server ntp-primary [ ,ntp-backup ]
no network ntp-server { ntp-primary [ ,ntp-backup ] }
```

Syntax description

`ntp-primary`	The first IP address to which the CableOS Core sends NTP time requests, either in numeric IPv4 or IPv6 format, or as a fully-qualified domain name.
`ntp-backup`	The second IP address to which the CableOS Core sends NTP time requests, either in numeric IPv4 or IPv6 format, or as a fully-qualified domain name.

Default

```
no network ntp-server
```

Command mode

Config mode.

Usage guidelines

Use the "ntp-server" to define one or two Network Time Protocol servers that the servers of the CableOS Core query to obtain the time of day for logging messages.

Examples

The following example sets the address of the server to be queried:

```
network ntp-server 100.17.105.243
```

Related information

clock timezone

packetcable

Use the `packetcable` command to enable and disable PacketCable operations.

`packetcable{enabled  | disabled}`

Syntax description

`enable`	Enables packetcable operations.
`disable`	Disables packetcable operations.

Default

By default, PacketCable operations are disabled.

Command mode

Config mode.

Usage guidelines

When PacketCable is enabled, CableOS Manager will accept incoming COPS connections. Disabling PacketCable will disable the acceptance of the new incoming COPS connections, but will not terminate the existing ones or calls in progress.

Example

The following example enables PacketCable operations:

```
packetcable enable
```

Related information

packetcable gate maxcount

packetcable timer T0 / packetcable timer T1

packetcable cops dscp

The `packetcable cops dscp` command allows the user to change the Differentiated Services Code Point (DSCP) marking for COPS messages that are transmitted by the CMTS.

`packetcable cops dscp` *value*

Syntax description

value	Specifies the marking for COPS messages that are transmitted by the CMTS. The following values are supported for the CMTS: 0-63 AF11 AF12 AF13 AF21 AF22 AF23 AF31 AF32 AF33 AF41 AF42 AF43 CS1 CS2 CS3 CS4 CS5 CS6 CS7 EF default

Default

The default setting is 0 for outgoing COPS messages.

Command mode

Config mode.

Usage guidelines

The `packetcable cops dscp` command changes the default IP parameters for connections between the CMTS and COPS servers in the cable network.

NOTE: The `packetcable cops` command is not a valid command by itself. It will return a syntax error: incomplete path.

Example

```
admin@CableOS(config)# packetcable cops dscp AF21
```

packetcable dqos-lite

Use the `packetcable dqos-lite` command to enable and disable PacketCable dqos-lite operations.

`packetcable dqos-lite{enabled | disabled }`

Syntax description

`enable`	Enables packetcable dqos-lite operations.
`disable`	Disables packetcable dqos-lite operations.

Default

By default, PacketCable dqos-lite operations are disabled.

Command mode

Config mode.

Usage guidelines

When PacketCable dqos-lite is enabled, a dynamic quality of service is available that only authorizes and provisions operations actually in the cable network.

Examples

The following example enables PacketCable dqos-lite operations:

```
packetcable dqos-lite enable
```

Related information

packetcable

packetcable dynamic

Use the `packetcable dynamic` command to enable and disable PacketCable dynamic operations.

`packetcable dynamic { enabled | disabled }`

Syntax description

`enable`	Enables packetcable dynamic operations.
`disable`	Disables packetcable dynamic operations.

Default

By default, PacketCable dynamic operations are disabled.

Command mode

Config mode.

Usage guidelines

When PacketCable dynamic is enabled, PacketCable 1.0 and 1.5 services are enabled.

Examples

The following example enables PacketCable dynamic operations:

```
packetcable dynamic enable
```

Related information

packetcable

packetcable gate maxcount

Use the `packetcable gate maxcount` command to configure the maximum number of Gate IDs that can be allocated.

`packetcable gate maxcount` *count*

Syntax description

count	The maximum number of Gate IDs. The valid range is 1 - 1048576 (1024 * 1024).

Default

The default value is 1048576.

Command mode

Config mode.

Usage guidelines

Sets the maximum number of Gate IDs to be allocated in the Gate database on the CMTS.

Examples

The following example sets the maximum number of Gate IDs to 1,000,000:

```
packetcable gate maxcount 1000000
```

Related information

packetcable

packetcable timer T0 / packetcable timer T1

packetcable multimedia

Use the `packetcable multimedia` command to enable and disable PacketCable multimedia operations.

`packetcable multimedia{enabled | disabled }`

Syntax description

`enable`	Enables packetcable multimedia operations.
`disable`	Disables packetcable multimedia operations.

Default

By default, PacketCable multimedia operations are disabled.

Command mode

Config mode.

Usage guidelines

When PacketCable multimedia is enabled, a PacketCable 2.0 and PacketCable MultiMedia (PCMM) services are enabled.

Examples

The following example enables PacketCable multimedia operations:

```
packetcable multimedia enable
```

Related information

packetcable

packetcable timer T0 / packetcable timer T1

Use the `packetcable timer` commands to set the length of the T0 and T1 timers.

`packetcable timer T0` *timer-value*

Syntax description

timer-value	Sets the value of the timer in seconds. The valid range is 1 to 255 seconds for T0 and 1 to 1,000,000 seconds for T1.

Default

The default value is 30 for the T0 timer and 200 for the T1 timer.

Command mode

Config mode.

Usage guidelines

This command sets the default value which may be overwritten by CMS.

Examples

The following example sets the T0 timer to 20 seconds:

```
packetcable timer T0 20
```

Related information

packetcable

packetcable gate maxcount

ping

Use the `ping` command to diagnose basic network connectivity issues as well as provide a simple link performance measurement.

```
ping {host-ip-address | host-name}
[ count count ] [ packet-size packet-size ] [ interval interval ] [ timeout timeout ]
```

Syntax description

host-ip-address	The IP address of the target host.
host-name	The name of the target host. The name may include up to 512 characters.
count	Specifies the number of ping packets that will be sent. The range is 1 to 2147483647 packets.
packet-size	Specifies the number of data bytes to be added to the ping packet. The range is 1 to 65468 bytes. The default is 56 bytes, resulting in a 64 byte packet when added to the 8 byte ICMP header.
interval	Specifies the time in seconds between sending ping packets. The range is 1 to 60 seconds. The default is 1 second.
timeout	Specifies the maximum period to continue sending packets when no response packets are received. The range is 1 to 60 seconds.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

When an IP address is configured on the NSI interface and has routing to the desired subnet, the command should perform the ping according to the command parameters.

Results should be consistent with the shell ping command.

Applicable for both IPv4 and IPv6.

Currently, the IP address on NSI must be defined manually.

prepare cable rpd tech-support

Use the `prepare cable rpd tech-support` command to generate the information needed for technical support staff.

`prepare cable rpd` [*v-slot* | *rpd-ip* | *rpd-mac*] `tech-support`

Syntax description

v-slot	The virtual slot of the RPD in the format VC:VS
rpd-ip	The IP address of the RPD.
rpd-mac	The MAC address of the RPD.

Default

This command has no default value.

Command mode

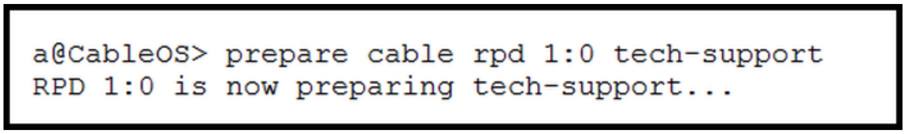
Exec mode.

Usage guidelines

Run this command to trigger the RPD to generate tech support information. While the RPD is preparing tech support, it is not possible to run another prepare command for the same RPD. The command is only applicable to ExoR RPDs.

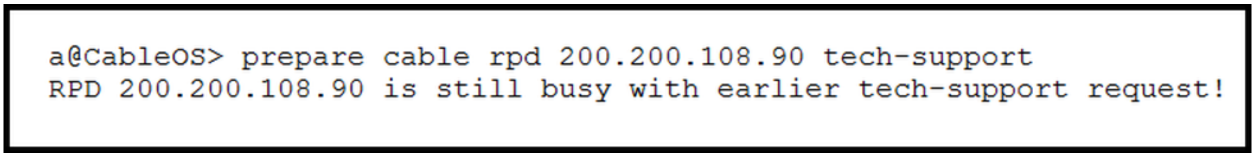
Examples

The following example shows the request to prepare tech support for the RPD in slot 1:0:



```
a@CableOS> prepare cable rpd 1:0 tech-support
RPD 1:0 is now preparing tech-support...
```

The following example shows the request to prepare tech support for the RPD at IP address 200.200.108.90, when there is a previous request still working:



```
a@CableOS> prepare cable rpd 200.200.108.90 tech-support
RPD 200.200.108.90 is still busy with earlier tech-support request!
```

Related information

fetch cable rpd tech-support

get-status cable rpd tech-support

privilege

Use the `privilege` command to configure a new privilege level for users. Use the **no** form of this command to remove privilege.

`privilege { level } password` *password*
`no privilege { level level }`

Syntax description

<table>
<tr><td><em>password</em></td><td>Sets the privilege level password.
The special characters that can be used in a password are limited to the following:
<code>?!\"#$%&'()*+,-./:<=>?@[]^_`{}~|\</code>
<strong>NOTE:</strong> The special character <code>”</code> may be used in a password but may not be at the end of the password string. For example, a password of <code>T4FxN9j4<”</code> is not valid.</td></tr>
</table>

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

There are no Usage Guidelines for this command.

Examples

The following example changes the password for privilege level 1

```
privilege 1 password GmCf4J]m%W
```

Related information

username

prompt

To modify the prompt for both the operational mode and the configuration mode in the current session, use the `prompt` command:

`[ prompt1 | prompt2 ]` *str*

Syntax description

`prompt1`	Defines the prompt for operational mode
`prompt2`	Defines the prompt for configuration mode
str	Use one of the special characters below: • \d - the date in "YYYY-MM-DD" format (for example, "2018-01-18") • \h - the hostname up to the first period ('.)' • \H - the full hostname • \s - the client source IP • \t - the current time in 24-hour HH:MM:SS format • \T - the current time in 12-hour HH:MM:SS format • \@ - the current time in 12-hour am/pm format • \A - the current time in 24-hour HH:MM format • \u - the username of the current user • \m - the mode name (exec or config) • \M - the mode name (exec or config) inside parenthesis

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

prompt1 is for the operational mode prompt and prompt2 is for the configuration mode. For prompt2 to take effect, you must exit config mode and then re-enter config mode.

Examples

To set the exec mode prompt to "{user}@{hostname}> " (e.g: "admin@cs010> "), use the following command:

```
prompt1 "\u@\h> "
commit
```

To set the config mode prompt to "{user}@{hostname}(config)# " (e.g: "admin@cs010(config) ", use the following command:

```
prompt2 "\u@\h\M# "
commit
```

Related information

cli prompt

pwd

Use the `pwd` command to display the current submode path.

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

There are no Usage Guidelines for this command.

Examples

The following example displays the submode path:

```
pwd
```

quit

Use the `quit` command to quit the current session.

`quit`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

There are no Usage Guidelines for this command.

Examples

The following quits from the current session in the CableOS Core:

```
quit
```

Related information

exit
history
logout
reboot

radius-server host

Use the `radius-server host` command to specify a RADIUS server host. To delete the host, use the **no** form of this command.

```
radius-server host{hostname  | ip-address}[ auth-port port-number ] [ timeout
seconds ] [ retransmit retries ] [ key string ]
no radius-server host{hostname  | ip-address}
```

Syntax description

`hostname`	Domain Name System (DNS) name of the RADIUS server host.
`ip-address`	IP address of the RADIUS server host.
`auth-port`	(Optional) Specifies the UDP destination port for authentication requests.
`port-number`	(Optional) Port number for authentication requests; the host is not used for authentication if set to 0. If unspecified, the port number defaults to 1645.
`timeout`	(Optional) The time interval (in seconds) that the router waits for the RADIUS server to reply before retransmitting. This setting overrides the global value of the `radius-server timeout` command. If no timeout value is specified, the global value is used. Enter a value in the range 1 to 1000.
`seconds`	(Optional) Specifies the timeout value. Enter a value in the range 1 to 1000. If no timeout value is specified, the global value is used.
`retransmit`	(Optional) The number of times a RADIUS request is re-sent to a server, if that server is not responding or responding slowly. This setting overrides the global setting of the `radius-server retransmit` command.
`retries`	(Optional) Specifies the authentication and encryption key used between the router and the RADIUS daemon running on this RADIUS server. This key overrides the global setting of the `radius-server key` command. If no key string is specified, the global value is used.

`key`	(Optional) Specifies the authentication and encryption key used between the router and the RADIUS daemon running on this RADIUS server. This key overrides the global setting of the `radius-server key` command. If no key string is specified, the global value is used. The key is a text string that must match the encryption key used on the RADIUS server. Always configure the key as the last item in the `radius-server host` command syntax. This is because leading spaces are ignored, but spaces within and at the end of the key are used. If you use spaces in the key, do not enclose the key in quotation marks unless the quotation marks themselves are part of the key.
`string`	(Optional) Specifies the authentication and encryption key for all RADIUS communications between the router and the RADIUS server. This key must match the encryption used on the RADIUS daemon. All leading spaces are ignored, but spaces within and at the end of the key are used. If you use spaces in your key, do not enclose the key in quotation marks unless the quotation marks themselves are part of the key.

Default

No RADIUS host is specified.

Command mode

Config mode.

Usage guidelines

You can use multiple `radius-server host` commands to specify multiple hosts. The software searches for hosts in the order in which you specify them.

If no host-specific timeout, retransmit, or key values are specified, the global values apply to each host.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Example

The following example specifies host010 as the RADIUS server and uses default ports for both accounting and authentication:

```
radius-server host host010
```

Related information

aaa accounting

aaa authorization

radius-server key

radius-server retransmit

radius-server timeout

radius-server key

Use the `radius-server key` command to set the authentication and encryption key for all RADIUS communications between the router and the RADIUS daemon. To disable the key, use the **no** form of this command.

```
radius-server key {0 string  | 7 string | string}
no radius-server key
```

Syntax description

`0 string`	Specifies that an unencrypted key will follow. The unencrypted (cleartext) shared key.
`7 string`	Specifies that a hidden key will follow. The hidden shared key.
`string`	The unencrypted (cleartext) shared key.

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

After enabling authentication, authorization, and accounting (AAA) authentication with the `aaa new-model` command, you must set the authentication and encryption key using the `radius-server key` command.

NOTE:

Specify a RADIUS key after you issue the `aaa new-model` command. The key entered must match the key used on the RADIUS daemon. All leading spaces are ignored, but spaces within and at the end of the key are used. If you use spaces in your key, do not enclose the key in quotation marks unless the quotation marks themselves are part of the key.

Examples

The following example sets the authentication and encryption key to "dare to go":

```
radius-server key dare to go
```

The following example sets the authentication and encryption key to "anykey." The 7 specifies that a hidden key will follow.

```
service password-encryption
radius-server key 7 anykey
```

After you save your configuration and use the `show-running config` command, an encrypted key will be displayed.

Related information

aaa accounting

aaa authorization

radius-server host

radius-server retransmit

Use the `radius-server retransmit` command to specify the number of times the CableOS software searches the list of RADIUS server hosts before giving up. To disable retransmission, use the **no** form of this command.

`radius-server retransmit` *retries*
`no radius-server retransmit`

Syntax description

retries	Maximum number of retransmission attempts. The default is 3 attempts.

Default

Three (3) retransmission attempts.

Command mode

Config mode.

Usage guidelines

The CableOS software tries all servers, allowing each one to time out before increasing the retransmit count.

Examples

The following example specifies a retransmit counter value of five:

```
radius-server retransmit 5
```

Related information

radius-server host

radius-server key

radius-server timeout

Use the `radius-server timeout` command to set the interval for which a router waits for a server host to reply. To restore the default, use the **no** form of this command.

`radius-server timeout` *seconds*
`no radius-server timeout`

Syntax description

seconds	A number that specifies the timeout interval, in seconds. The default is five (5) seconds.

Default

Five second timeout interval.

Command mode

Config mode.

Usage guidelines

Use this command to set the number of seconds a router waits for a server host to reply before timing out.

Examples

The following example changes the interval timer to 10 seconds:

```
radius-server timeout 10
```

Related information

radius-server host

radius-server key

reboot

Use the `reboot` command to force a reboot of all components of the CableOS Core on a given server.

`reboot` *server*

Syntax description

server	Defines the server to be rebooted.

Command mode

Exec mode.

Example

The following example restarts all components of the CableOS Core on server cs023:

```
reboot cs023
```

Related information

exit
history
logout
quit

reboot passive all

Use the `reboot passive all` command to reboot after switching to the passive partition.

`reboot passive all`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

Execute this command after an installation to reboot the system with new software or to switch to a previously installed version.

Examples

The following example reboots after an installation:

```
reboot passive all
```

Related information

install

show images

show upgrade process

reboot passive hitless

show version

show version cluster-server

show version cluster-server all

show version cluster-nic

validate-iso-md5

reboot passive hitless

Use the `reboot passive hitless` command to switch to the passive partition and reboot every node one by one without stopping service provisioning.

```
reboot passive hitless
```

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

Execute this command after software installation to reboot the system with new software or to switch to the previously installed version, without stopping service provisioning.

This command requires the build installed on the active partition to be ISSU-compatible with the build installed on the passive partition. Otherwise it may lead to incorrect functioning of the system or even full system inoperability.

Before execution, the command will always remind the user about ISSU-compatibility and give the option to not continue the reboot.

The command will first check the protection state of the cluster and the state of the services. If the cluster is "unprotected" or the build installation process is in action, the command will abort.

If there are other malfunctions (even those that are not influencing the cluster protection state), the user will be warned and given the choice to continue or stop the process.

After verification, the reboot process starts to reboot nodes one by one. There is no determined order in which nodes will be rebooted, except for the master node, which will be rebooted last.

The reboot of every node will start only after the previous node is fully initialized and cluster protection status is acquired. In case of failure, the command will continue rebooting the nodes that are left.

When reboot of the master node starts, the CLI session will be terminated and for a short period of time, the user will not be able to log in to CLI.

Example

The following example reboots after an installation:

```
reboot passive hitless
```

Related information

install
show images
show upgrade process
reboot passive all
show version
show version cluster-server
show version cluster-server all
show version cluster-nic
validate-iso-md5

rebalance lcce

Use the `rebalance lcce` command to manually trigger a controlled switchover of the active LCCE load to its standby server.

`rebalance lcce` *lcce-ip-address destination-server-name*

Syntax description

`lcce-ip-address`	The IP address of the LCCE
`destination-server-name`	The server designated as the standby server.

Command mode

Exec mode.

Usage guidelines

The destination server must be the one designated as the standby server for the LCCE in the show cluster status command. Otherwise, the command will fail.

After such controlled switchover, allow enough time for the standby to be established on the source server before calling it again. The appearance of the server name in the standby column in the show cluster status command is an indication that the standby was successfully established.

This command is usually only used in a testing scenario.

Examples

```
rebalance lcce 192.168.8.101 cs022
```

Related information

ha master move

show cluster history

reset cable rpd

Use the `reset cable rpd` command to force a Remote Phy Device reset.

`reset cable rpd` [*v-slot* | *rpd-ip* | *rpd-mac*] [`reset-type` { *hard* | *non-volatile* | *factory* }]

Syntax description

v-slot	The virtual slot of the RPD in the format VC:VS
rpd-ip	The IP address of the RPD.
rpd-mac	The MAC address of the RPD.
reset-type	(Optional) Choose the type of reset type to perform. The default value is *hard*

Command mode

Exec mode.

Usage guidelines

After every reset, a log is appended to `/var/log/reset_cause`.

The following reset types are available:

- **hard** - resets logs, the stm32 chip, and executes a reboot. This is the default reset type.
- **non-volatile** - Resets logs and executes a reboot.
- **factory** - Performs the following:
    - Deletes the files listed in `/usr/share/rpd-cli/deleteOnReset`
    - Restores the files listed in `/usr/share/rpd-cli/restoreOnReset` to their default state
    - Removes public keys from `~/.ssh/authorized_keys` for the admin user
    - Executes a hard reset, as described above
- **soft**

Example

The following example will trigger a factory reset for the RPD at IP address IP address 200.200.108.90:

```
reset cable rpd 200.200.108.90 reset-type factory
```

Related information

cable rpd video-type

restore-factory-settings

Use the `restore-factory-settings` command to restart the COS Core server with an empty configuration.

```
restore-factory-settings
```

Syntax description

This command has no arguments or keywords.

Default

This command has no default value.

Command mode

Exec mode

Usage guidelines

Enter the command and then confirm at the prompt. The system will reboot.

All configuration that was in the startup config will be lost, with the exception of the management IP.

When the command executes, the following is done:

1. Extracts and saves the management IP address from the running configuration.
2. Deletes all configurations.
3. Sets the factory default configuration.
4. Resets the Management IP address to the address extracted in step 1.
5. Copies the new running configuration to the startup-config file.
6. Reboots all.

restore startup-config

Use the `restore startup-config` command to restore an archived startup-config.

`restore startup-config revision` *revision-number*

Syntax description

revision-number	The number of the startup-config revision to restore, as displayed by the `show startup-config archive` command.

Default

This command has no default value.

Command mode

Exec mode

Usage guidelines

The command restores the startup-config in the same way as the `copy <file-name> startup-config` command. This means that the command also creates a new startup-config revision, which will be visible in the output of the `show startup-config archive` command. The command does NOT modify the running config.

NOTE: After the command has completed the restore, you must reboot the system to apply the changes.

Examples

```
dmin@CableOS> restore startup-config revision 1
Are you sure? [yes,NO] yes
Overwriting startup-config with a revision from 2021-03-10 12:59:15 (143.8K)...
Done
The startup-config has been restored. Reboot the system to apply the changes. The
 running-config has NOT been modified.
```

Related information

show startup-config archive

copy startup-config <file-name>

Chapter 4

CLI Commands: sce - zzz

- *show cable modem bonding*
- *show cable modem calls*
- *show cable modem classifiers*
- *show cable modem cm-status*
- *show cable modem connectivity*
- *show cable modem counters*
- *show cable modem cpe*
- *show cable modem cpe dhcp*
- *show cable modem dhcp*
- *show cable modem docsis device-class*
- *show cable modem docsis version*
- *show cable modem ipv6*
- *show cable modem lcce*
- *show cable modem leasequery-filter*
- *show cable modem load-balance group*
- *show cable modem mtu*
- *show cable modem ofdm-profile*
- *show cable modem ofdma-profile*
- *show cable modem offline*
- *show cable modem partial-mode*
- *show cable modem phy*
- *show cable modem primary-channel*
- *show cable modem privacy*
- *show cable modem qos*
- *show cable modem registered*
- *show cable modem remote-query*
- *show cable modem ripv2*
- *show cable modem rogue*
- *show cable modem select*
- *show cable modem service-flow*
- *show cable modem summary*
- *show cable modem ugs*
- *show cable modem unregistered*
- *show cable modem uptime*
- *show cable modem vendor*
- *show cable modem verbose*
- *show cable modulation-profile*
- *show cable mod-prof-ofdma*
- *show cable multicast*
- *show cable privacy*
- *show cable proto-throttle*
- *show cable ptp time-property*
- *show cable rcp*
- *show cable reef chassis*
- *show cable remote-query cm*
- *show cable rpd*

- *show cable rpd counters*
- *show cable rpd description*
- *show cable rpd environment*
- *show cable rpd identify-failed*
- *show cable rpd mtu*
- *show cable rpd ndfr*
- *show cable rpd passive*
- *show cable rpd port-transceiver*
- *show cable rpd * ptp*
- *show cable rpd reset-history*
- *show cable rpd session*
- *show cable rpd spanning-tree*
- *show cable rpd ssh-public-key*
- *show cable rpd video-channel*
- *show cable rpd video-type*
- *show cable us-rf-port ofdma-channel*
- *show cable us-rf-port ofdma-channel data-mer*
- *show cable us-rf-port ofdma-channel probe-mer*
- *show cable us-rf-port ucd-refresh*
- *show capture preconfigured us-spectrum*
- *show capture us-spectrum*
- *show capture us-wb-spectrum*
- *show cluster history*
- *show cluster status*
- *show cluster status verbose*
- *show cluster summary*
- *show cops servers*
- *show csr*
- *show dynamic-bonding-group*
- *show environment cable rpd*
- *show environment temperature*
- *show environment voltage*
- *show history*
- *show images*
- *show interface cable sid*
- *show interface forwarding*
- *show interface iuc-stat*
- *show interface snr*
- *show interfaces description*
- *show interfaces status*
- *show inventory core*
- *show inventory rpd*
- *show ipdr collector*
- *show ipdr exporter*
- *show ipdr session*
- *show lcce*

- *show lcce summary*
- *show log*
- *show log local*
- *show log summary*
- *show packetcable cms*
- *show packetcable gate*
- *show packetcable gate summary*
- *show packetcable global*
- *show packetcable log*
- *show rpn alarms*
- *show rpn config*
- *show rpn environment*
- *show rpn verbose*
- *show running-config*
- *show running-config cable privacy hotlist*
- *show running-config cable mtu-enhance*
- *show snmp*
- *show startup-config*
- *show startup-config archive*
- *show system ipsec tunnel state*
- *show system proto-throttle*
- *show system scep*
- *show tech-support*
- *show upgrade process*
- *show utilization ds*
- *show utilization us*
- *show version*
- *show version cable rpd*
- *show version cluster-bios*
- *show version cluster-nic*
- *show version cluster-server*
- *show version cluster-server all*
- *snmp-server*
- *snmp-server community*
- *snmp-server community-encryption*
- *snmp-server contact*
- *snmp-server enable traps*
- *snmp-server enable traps aaa-server status*
- *snmp-server enable traps cable*
- *snmp-server enable traps core md-map-advance-changed*
- *snmp-server enable traps core scep-event*
- *snmp-server enable traps docsis-events*
- *snmp-server enable traps rpd-events connectivity*
- *snmp-server enable traps rpd ssh-status*
- *snmp-server enable traps snmp*
- *snmp-server enable traps user-mgmt user-change*

- *snmp-server engineID*
- *snmp-server group*
- *snmp-server host*
- *snmp-server informs*
- *snmp-server location*
- *snmp-server monitor core sensor temperature threshold*
- *snmp-server monitor core sensor voltage threshold*
- *snmp-server name*
- *snmp-server user*
- *snmp-server view*
- *snmp trap link-status*
- *spanning-tree mstp*
- *ssh*
- *start logging monitor*
- *stop logging monitor*
- *system ipsec tunnel*
- *system management in-band-ssh-password*
- *system management ip-address*
- *system management ipv6-address*
- *system management netconf*
- *system management snmp fast-counters*
- *system management sonar-service*
- *system management sshd extended-security*
- *system management sub-interface*
- *system management user*
- *system mtu*
- *system proto-filter ds-broadcast*
- *system proto-throttle*
- *system scep*
- *tacacs-server directed-request*
- *tacacs-server host*
- *tacacs-server key*
- *telnet*
- *terminal monitor*
- *test cable dbc*
- *test cable dcc*
- *test cable dsd*
- *trigger dlm mac-domain*
- *update cable rpd mso-cvc-chain*
- *username*
- *validate-iso-md5*

Overview

This chapter contains individual descriptions of the CLI commands within the CableOS System Command Line Interface (CLI). These commands are used to interface with, configure, manage, and maintain the CableOS System.

scep enrollment

Use the `scep enrollment` command to initiate SCEP enrollment for a single certificate.

`scep enrollment` *num* [`password` *password*]

Syntax description

num	The number of a certificate which needs to be enrolled.
password	An optional password which is sent to the SCEP server.

Default

This command has no default value.

Command mode

Config mode

Examples

```
scep enrollment 1 password dd4232g5354ds
```

Related information

system scep

scep renewal

show system scep

snmp-server enable traps core scep-event

scep renewal

Use the `scep renewal` command to start renewal for a specific certificate.

`scep renewal` *num*

Syntax description

num	The number of a certificate which needs to be renewed.

Default

This command has no default value.

Command mode

Config mode

Usage Guidelines

Usually this command is needed for testing only, as renewal happens automatically.

Examples

```
scep renewal 1
```

Related information

system scep

scep enrollment

show system scep

snmp-server enable traps core scep-event

set cable rpd spanning-tree

Use the `set cable rpd spanning-tree` command to redirect traffic manually from one port to another..

`set cable rpd` *vc:vs* `spanning-tree` { `default` | `root sfp` [`1` | `2`] }

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
`spanning-tree`	• `default` - use the default port, sfp 1 • `root sfp 1` - use port sfp 1 • `root sfp 2` - use port sfp 2

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

After setting the active port, the RPD must be rebooted.

Examples

The example below switches to active port 2 on the RPD:

```
CableOS> set cable rpd 72:0 spanning-tree root sfp 2
```

Related information

spanning-tree mstp

cable rpd * mstp

show cable rpd spanning-tree

set rpn

Use the `set rpn` command to define the power settings of the RPD node and of the Pebble module installed in it.

`set rpn` *v-slot* [`us1-1-ics` *power*] [`us1-2-ics` *power*] [`us1-3-ics` *power*] [`us2-1-ics` *power*] [`us2-2-ics` *power*] [`us2-3-ics` *power*] [`us1-out-level` *power*] [`us2-out-level` *power*]

Syntax description

v-slot	The chassis and slot of the RPN to be configured.
`us1-1-ics`, `us1-2-ics`, `us1-1-3c`sus1-ics	Set the three US1 Ingress Control Switches (ICS) power in dB. Valid range is from -45.0 - 0 dB, in steps of 1.0 dB Possible values: -45 dB, -6 dB, 0 dB Setting values [-44 dB , -7 dB] and [-5 dB , -1 dB] lead to applying 0 dB
`us2-1-ics`, `us2-2-ics`, `us2-3-ics`	Set the three US2 Ingress Control Switches (ICS) power in dB. Valid range is from -45.0 - 0 dB, in steps of 1.0 dB Possible values: -45 dB, -6 dB, 0 dB Setting values [-44 dB , -7 dB] and [-5 dB , -1 dB] lead to applying 0 dB
`us1-out-level`, `us2-out-level`	Set the us1 and us2 amplification of the signal path, in dB. Valid range is from +10.0 - +15.0 dB, in steps of 0.5 dB

Default

This command has no default value.

Command mode

Exec mode.

Example

The following sets the power for the second US1 Ingress Control Switch to 45 dB:

```
set rpn 28:0 us1-2-ics -45
```

Related information

show rpn config

set rpn agc-pwr-detect

Use the `set rpn agc-pwr-detect` command to configure the Ripple Node's AGC power detect.

`set rpn` [{ *v-slot ip mac* }] `agc-pwr-detect` *power*

Syntax description

v-slot	The chassis and slot of the RPN to be displayed.
ip	The IP address of the RPN to be displayed.
mac	The MAC address of the RPN to be displayed.
power	The value for the RPN's AGC power detect in an 8 bit hex format. The default value is 0x41.

Default

The default value for the AGC power detect is 0x41. in an 8 bit hex value.

Command mode

Exec mode.

Usage guidelines

! **IMPORTANT:** If the RPD software version is 1.20 or later, for any changes to this configuration to take effect, you MUST reboot the RPD.

Example

The following example sets the AGC power detect of the RPN at slot 1:0 to 0x42:

```
set rpn 1:0 agc-pwr-detect 0x42
```

Related information

set rpn forward-seg

set rpn hybrid1

set rpn return-attn

set rpn return-seg

set rpn * alarm

Use the `set rpn alarm` command to define the upper and lower thresholds at which the power alarms will be activated.

`set rpn` *v-slot* [`ds-power-alarm` `threshold-low-crit` *power*] [`threshold-low-non-crit` *power*] [`threshold-hi-non-crit` *power*] [`threshold-hi-crit` *power*] `enable` { *all* | *critical-only* | *hi-all* | *low-all* | *none* }

Syntax description

v-slot	The chassis and slot of the RPN to be configured.
threshold-low-crit	The value for the lower critical threshold in dB
threshold-low-non-crit	The value for the lower non-critical threshold in dB
threshold-hi-non-crit	The value for the higher non-critical threshold in dB
threshold-hi-crit	The value for the higher critical threshold in dB
enable	Enables/disables the thresholds. It can have one of the following values: • *all* - enables all thresholds • *critical-only* - enables only the higher and lower critical thresholds • *hi-all* - enables only the higher non-critical and higher critical thresholds • *low-all* - enables only the lower non-critical and lower critical thresholds • *none* - disables all thresholds

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

You must enter the values of all four thresholds.

IMPORTANT: For any changes to this configuration to take effect, you MUST reboot the RPD.

set rpn forward-seg

Use the `set rpn forward-seg` command to configure the Ripple Node's forward segmentation.

`set rpn` [{ *v-slot ip mac*] `|` `forward-seg` [*rpd1-l-rpd2-r rpd1-lr rpd2-lr* }]

Syntax description

v-slot	The chassis and slot of the RPN to be displayed.
ip	The IP address of the RPN to be displayed.
mac	The MAC address of the RPN to be displayed.
rpd1-l-rpd2-r	RPD1 downstream port forwarded to Ripple ports P1 and P2. RPD2 downstream port forwarded to Ripple ports P3 and P4
rpd1-lr	RPD1 downstream port forwarded to Ripple ports P1, P2, P3 and P4
rpd2-lr	RPD2 downstream port forwarded to Ripple ports P1, P2, P3 and P4

Default

There is no default value for this command.

Command mode

Exec mode.

Usage guidelines

! **IMPORTANT:** If the RPD software version is 1.20 or later, for any changes to this configuration to take effect, you MUST reboot the RPD.

Example

The following example sets the RPD2 downstream port of the RPN at slot 1:0 to be forwarded to Ripple ports P1, P2, P3 and P4:

```
set rpn 1:0 forward-seg 0x42
```

Related information

set rpn agc-pwr-detect

set rpn hybrid1

set rpn return-attn

set rpn return-seg

set rpn hybrid1

Use the `set rpn hybrid` command to enable and disable the RF launch amplifier for upstream ports 1 and 2 and NOT ports 3 and 4.

`set rpn` [{ *v-slot ip mac*] | `hybrid1` [*disabled* | *enabled* }]

Syntax description

This command has no arguments or keywords.

Default

There is no default value for this command.

Command mode

Exec mode.

Examples

The following example enables the RF launch amplifier of the RPN at slot 1:0 for upstream ports 1 and 2:

```
set rpn 1:0 hybrid1 enabled
```

Related information

set rpn agc-pwr-detect

set rpn forward-seg

set rpn return-attn

set rpn return-seg

set rpn hybrid2

Use the `set rpn hybrid` command to enable and disable the RF launch amplifier for upstream ports 3 and 4 and NOT ports 1 and 2.

`set rpn` [{ *v-slot ip mac*] | `hybrid2` [*disabled* | *enabled* }]

Syntax description

This command has no arguments or keywords.

Default

There is no default value for this command.

Command mode

Exec mode.

Example

The following example enables the RF launch amplifier of the RPN at slot 1:0 for upstream ports 3 and 4:

```
set rpn 1:0 hybrid2 enabled
```

set rpn return-seg

Use the `set rpn return-seg` command to configure the port's return segmentation mode.

`set rpn` { *v-slot* | *ip* | *mac* } `port1-return-seg` [`rpd1us1` | `rpd1us2` | `rpd2us1` | `rpd2us2`]

`set rpn` { *v-slot* | *ip* | *mac* } `port2-return-seg` [`rpd1us1` | `rpd1us2` | `rpd2us1` | `rpd2us2`]

`set rpn` { *v-slot* | *ip* | *mac* } `port3-return-seg` [`rpd1us1` | `rpd1us2` | `rpd2us1` | `rpd2us2`]

`set rpn` { *v-slot* | *ip* | *mac* } `port4-return-seg` [`rpd1us1` | `rpd1us2` | `rpd2us1` | `rpd2us2`]

Syntax description

`v-slot`	The chassis and slot of the RPN to be displayed.
`ip`	The IP address of the RPN to be displayed.
`mac`	The MAC address of the RPN to be displayed.
`port`	The port to be configured: port1 port2 port3 port4
`return-seg`	• rpd1us1 - Valid on ports 1-4 when using forward segmentation of rpd1-lr, ports 1-2 when using rpd1-l-rpd2-r. • rpd1us2 - Valid on ports 1-4 when using forward segmentation of rpd1-lr, ports 1-2 when using rpd1-l-rpd2-r. • rpd2us1 - Valid on ports 1-4 when using forward segmentation of rpd2-lr, ports 3-4 when using rpd1-l-rpd2-r • rpd2us2 - Valid on ports 1-4 when using forward segmentation of rpd2-lr, ports 3-4 when using rpd1-l-rpd2-r

Default

There is no default value for this command.

Command mode

Exec mode.

Example

The following example configures port 3 of the RPN at slot 1:0 with a return segment mode of rpd2us1:

```
set rpn 1:0 port3-return-seg rpd2us1
```

Related information

set rpn agc-pwr-detect
set rpn forward-seg
set rpn hybrid1
set rpn return-attn

show cable admission-control bandwidth-distribution

Use the `show cable admission-control bandwidth-distribution` command to display the distribution of bandwidth between different channels, calculated using the admission-control algorithm.

`show cable admission-control bandwidth-distribution` [`ds-rf-port` | `us-rf-port`] [`admitted` | `free` | `utilization`]

Syntax description

`ds-rf-port`	(Optional) Displays the results for only one downstream port, for example, Ds1:0/0.
`us-rf-port`	(Optional) Displays results for only one upstream port, for example, Us1:0/0.
`admitted`	(Optional) Displays the admitted and total bandwidth per channel in bits per second.
`free`	(Optional) Displays the free and total bandwidth per channel in bits per second.
`utilization`	(Optional) Displays the admitted bandwidth as a percent of the configured bandwidth per QoS class as “utilization”.
`none (empty)`	(Optional) Displays the admitted and total bandwidth per channel in percent.

Command mode

Exec mode.

Usage guidelines

You can omit all the arguments and get the admitted bandwidth as a percent of the total bandwidth per QoS class, and the total bandwidth per QoS class as a percent of the total bandwidth per channel.

The command can display the admitted and free bandwidth for each channel per QoS class of traffic in bits per second. It can also show utilized bandwidth in percent of total bandwidth.

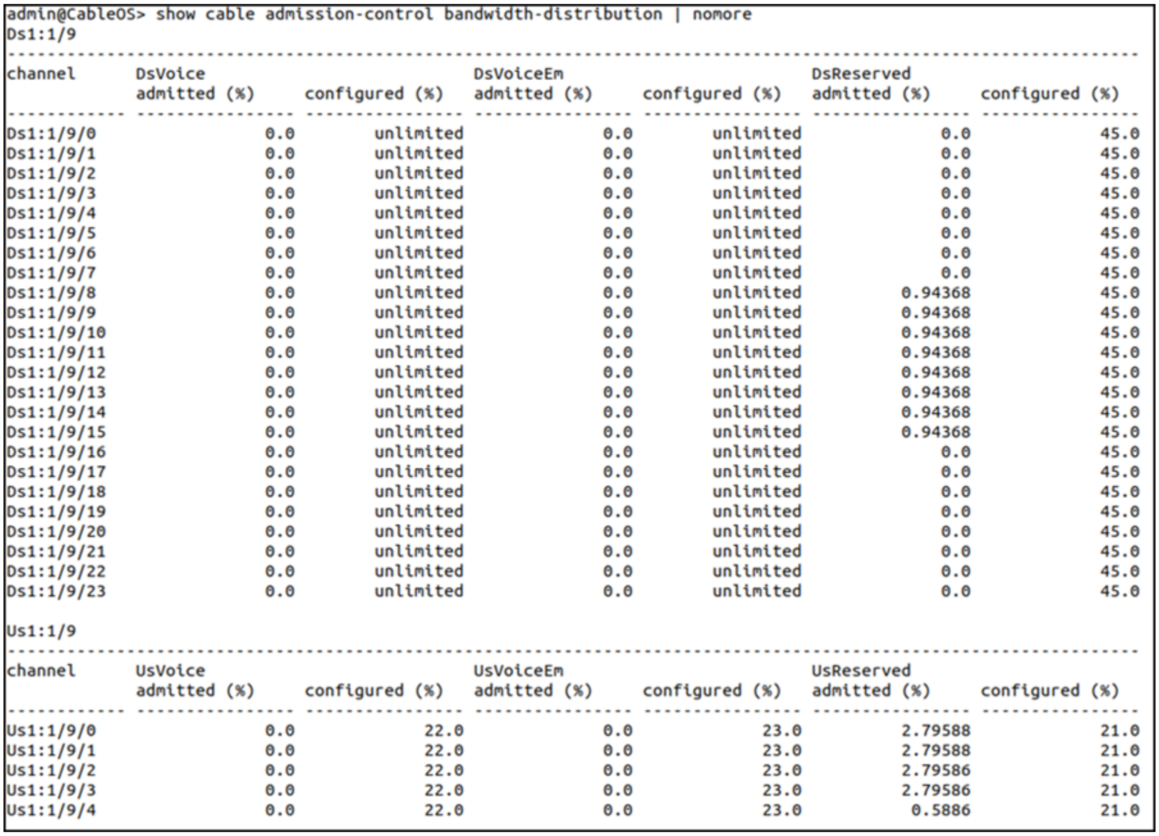
Configuring 'unlimited' for any of the QoS classes means that there is no limiting bandwidth usage and the show command will display '0' for Used bandwidth and 'unlimited' for Free bandwidth.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

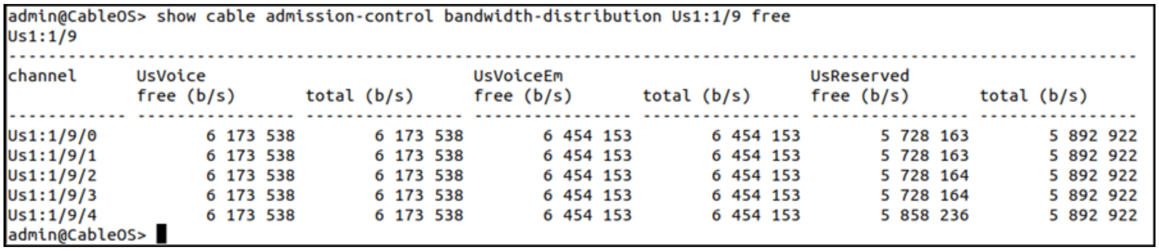
Examples

With no arguments:



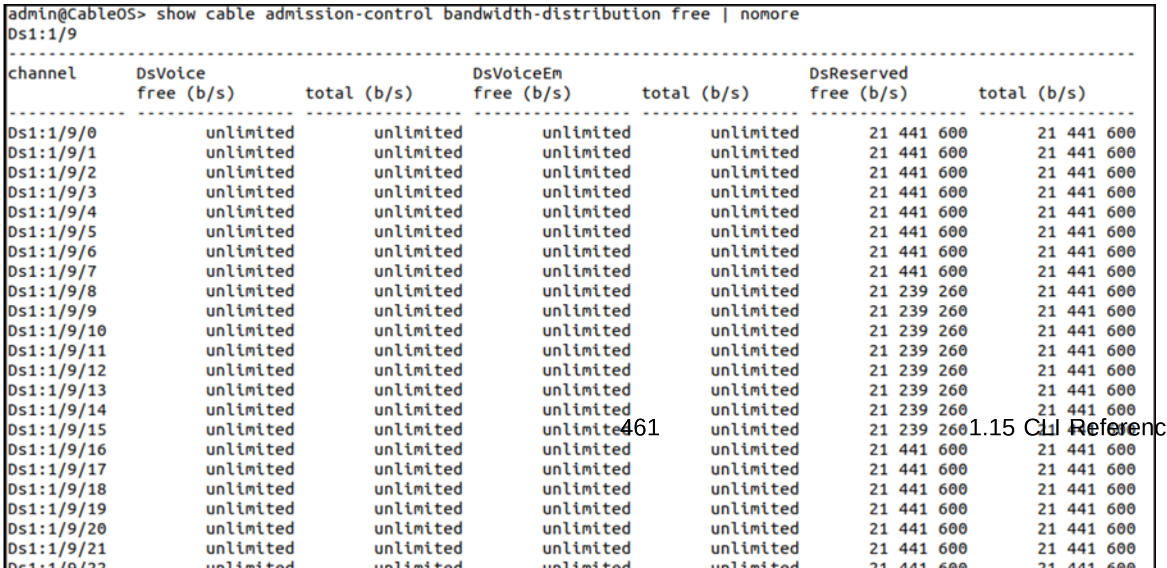
```
admin@CableOS> show cable admission-control bandwidth-distribution | nomore
Ds1:1/9
------------------------------------------------------------------------------------------------------------------
channel      DsVoice                           DsVoiceEm                         DsReserved
             admitted (%)     configured (%)   admitted (%)     configured (%)   admitted (%)     configured (%)
------------ ---------------- ---------------- ---------------- ---------------- ---------------- ----------------
Ds1:1/9/0                 0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/1                 0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/2                 0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/3                 0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/4                 0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/5                 0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/6                 0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/7                 0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/8                 0.0        unlimited              0.0        unlimited          0.94368             45.0
Ds1:1/9/9                 0.0        unlimited              0.0        unlimited          0.94368             45.0
Ds1:1/9/10                0.0        unlimited              0.0        unlimited          0.94368             45.0
Ds1:1/9/11                0.0        unlimited              0.0        unlimited          0.94368             45.0
Ds1:1/9/12                0.0        unlimited              0.0        unlimited          0.94368             45.0
Ds1:1/9/13                0.0        unlimited              0.0        unlimited          0.94368             45.0
Ds1:1/9/14                0.0        unlimited              0.0        unlimited          0.94368             45.0
Ds1:1/9/15                0.0        unlimited              0.0        unlimited          0.94368             45.0
Ds1:1/9/16                0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/17                0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/18                0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/19                0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/20                0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/21                0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/22                0.0        unlimited              0.0        unlimited              0.0             45.0
Ds1:1/9/23                0.0        unlimited              0.0        unlimited              0.0             45.0

Us1:1/9
------------------------------------------------------------------------------------------------------------------
channel      UsVoice                           UsVoiceEm                         UsReserved
             admitted (%)     configured (%)   admitted (%)     configured (%)   admitted (%)     configured (%)
------------ ---------------- ---------------- ---------------- ---------------- ---------------- ----------------
Us1:1/9/0                 0.0             22.0              0.0             23.0          2.79588             21.0
Us1:1/9/1                 0.0             22.0              0.0             23.0          2.79588             21.0
Us1:1/9/2                 0.0             22.0              0.0             23.0          2.79586             21.0
Us1:1/9/3                 0.0             22.0              0.0             23.0          2.79586             21.0
Us1:1/9/4                 0.0             22.0              0.0             23.0           0.5886             21.0
```

With ‘free’ argument and filter by port:



```
admin@CableOS> show cable admission-control bandwidth-distribution Us1:1/9 free
Us1:1/9
------------------------------------------------------------------------------------------------------------------
channel      UsVoice                           UsVoiceEm                         UsReserved
             free (b/s)       total (b/s)      free (b/s)       total (b/s)      free (b/s)       total (b/s)
------------ ---------------- ---------------- ---------------- ---------------- ---------------- ----------------
Us1:1/9/0           6 173 538        6 173 538        6 454 153        6 454 153        5 728 163        5 892 922
Us1:1/9/1           6 173 538        6 173 538        6 454 153        6 454 153        5 728 163        5 892 922
Us1:1/9/2           6 173 538        6 173 538        6 454 153        6 454 153        5 728 164        5 892 922
Us1:1/9/3           6 173 538        6 173 538        6 454 153        6 454 153        5 728 164        5 892 922
Us1:1/9/4           6 173 538        6 173 538        6 454 153        6 454 153        5 858 236        5 892 922
admin@CableOS> █
```

With 'free' argument:



```
admin@CableOS> show cable admission-control bandwidth-distribution free | nomore
Ds1:1/9
------------------------------------------------------------------------------------------------------------------
channel      DsVoice                           DsVoiceEm                         DsReserved
             free (b/s)       total (b/s)      free (b/s)       total (b/s)      free (b/s)       total (b/s)
------------ ---------------- ---------------- ---------------- ---------------- ---------------- ----------------
Ds1:1/9/0           unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/1           unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/2           unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/3           unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/4           unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/5           unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/6           unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/7           unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/8           unlimited        unlimited        unlimited        unlimited       21 239 260       21 441 600
Ds1:1/9/9           unlimited        unlimited        unlimited        unlimited       21 239 260       21 441 600
Ds1:1/9/10          unlimited        unlimited        unlimited        unlimited       21 239 260       21 441 600
Ds1:1/9/11          unlimited        unlimited        unlimited        unlimited       21 239 260       21 441 600
Ds1:1/9/12          unlimited        unlimited        unlimited        unlimited       21 239 260       21 441 600
Ds1:1/9/13          unlimited        unlimited        unlimited        unlimited       21 239 260       21 441 600
Ds1:1/9/14          unlimited        unlimited        unlimited        unlimited       21 239 260       21 441 600
Ds1:1/9/15          unlimited        unlimited        unlimited        unlimited       21 239 260       21 441 600
Ds1:1/9/16          unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/17          unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/18          unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/19          unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/20          unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/21          unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
Ds1:1/9/22          unlimited        unlimited        unlimited        unlimited       21 441 600       21 441 600
```

Output columns

Field	Description
DsVoice Admitted	The admitted bandwidth per channel for downstream voice traffic
DsVoiceEm Admitted	The admitted bandwidth per channel for downstream voice emergency traffic
DsReserved Admitted	The admitted bandwidth per channel for downstream minimum-reserved-rate traffic
UsVoice Admitted	The admitted bandwidth per channel for upstream voice traffic
USVoiceEm Admitted	The admitted bandwidth per channel for upstream voice emergency traffic
UsReserved Admitted	The admitted bandwidth per channel for upstream minimum-reserved-rate traffic
DsVoice Free	The free bandwidth per channel for downstream voice traffic
DsVoiceEm Free	The free bandwidth per channel for downstream voice emergency traffic
DsReserved Free	The free bandwidth per channel for downstream minimum-reserved-rate traffic
UsVoice Free	The free bandwidth per channel for upstream voice traffic
UsVoiceEm Free	The free bandwidth per channel for upstream voice emergency traffic
UsReserved Free	The free bandwidth per channel for upstream minimum-reserved-rate traffic
DsVoice Utilization	The admitted bandwidth as a percent of the configured bandwidth for downstream voice traffic
DsVoiceEm Utilization	The admitted bandwidth as a percent of the configured bandwidth for downstream voice emergency traffic
DsReserved Utilization	The admitted bandwidth as a percent of the configured bandwidth for downstream minimum-reserved-rate traffic
UsVoice Utilization	The admitted bandwidth as a percent of the configured bandwidth for upstream voice traffic
UsVoiceEm Utilization	The admitted bandwidth as a percent of the configured bandwidth for upstream voice emergency traffic
UsReserved Utilization	The admitted bandwidth as a percent of the configured bandwidth for upstream minimum-reserved-rate traffic

Related information

cable us-rf-port * ofdma-channel * us-channel-admission-control-profile
cable us-channel-admission-control-profile
cable us-rf-port * us-phy-channel * us-logical-channel * us-channel-admission-control-profile
cable ds-channel-admission-control-profile
cable ds-rf-port * down-channel * ds-channel-admission-control-profile
cable ds-rf-port * ofdm-channel * admission-control-modulation-profile
cable ds-rf-port * ofdm-channel * ds-channel-admission-control-profile

show cable downstream leasequery-filter

Use the `show cable downstream leasequery-filter` command to display the number of Dynamic Host Configuration Protocol (DHCP) LEASEQUERY request messages that have been sent or filtered due to downstream unknown destination IP addresses.

```
show cable downstream leasequery-filter [{ipv4 | ipv6}]
```

Syntax description

`ipv4`	(Optional) Displays counts for only LEASEQUERYs triggered due to unknown IPv4 version addresses.
`ipv6`	(Optional) Displays counts for only LEASEQUERYs filtered due to unknown IPv6 version addresses.

Command mode

Exec mode.

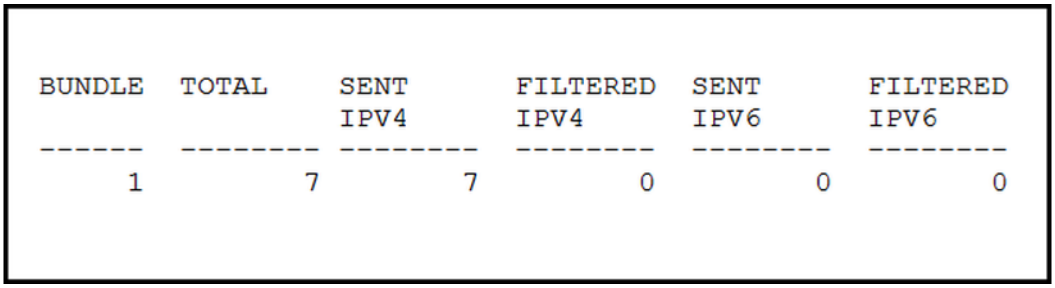
Usage guidelines

The command displays for each cable bundle the number of DHCP LEASEQUERY messages sent and filtered for each IP version selected. If neither ipv4 or ipv6 is specified, counts for both IP versions are displayed.

Note that for LEASEQUERY packets triggered by downstream packets, the CM and hence MAC domain are not known, so the CableOS Core maintains LEASEQUERY counts on a per-cable-bundle basis for each IP version.

Example

```
show cable downstream leasequery-filter
```



```
BUNDLE  TOTAL     SENT      FILTERED  SENT      FILTERED
                  IPV4      IPV4      IPV6      IPV6
------ --------- --------- --------- --------- ---------
     1         7         7         0         0         0
```

Output columns

Field	Description
BUNDLE	The ID of the Cable Bundle
TOTAL	The total number of DHCP LEASEQUERY request messages that have been sent or filtered

Field	Description
SENT IPV4	The number of IPv4 DHCP LEASEQUERY request messages that have been sent
FILTERED IPV4	The number of IPv4 DHCP LEASEQUERY request messages that have been filtered
SENT IPV6	The number of IPv6 DHCP LEASEQUERY request messages that have been sent
FILTERED IPV6	The number of IPv6 DHCP LEASEQUERY request messages that have been filtered

Related information

cable bundle source-verify leasequery downstream
cable bundle source-verify leasequery upstream
clear cable downstream leasequery-filter
clear cable modem leasequery-filter
show cable modem leasequery-filter

show cable dsg tg

Use the `show cable dsg tg` command to display information about DSG Tunnel groups.

`show cable dsg tg` [*tg-id* [`channel` *channel-id*]]

Syntax description

tg-id	Displays information only about this specific tunnel group.
channel-id	Displays information only about this specific channel.

Command mode

Exec mode.

Usage guidelines

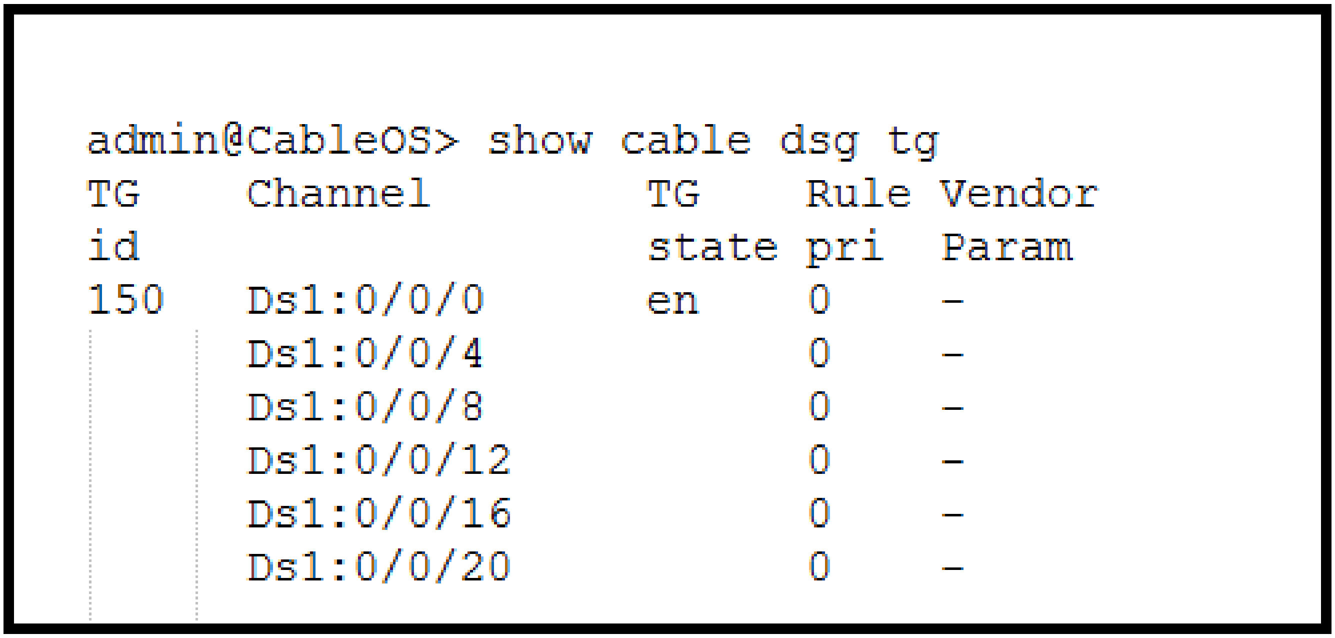
There are no Usage Guidelines for this command.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example displays the output for all tunnel groups:



```
admin@CableOS> show cable dsg tg
TG     Channel         TG    Rule Vendor
id                     state pri  Param
150    Ds1:0/0/0       en    0    -
       Ds1:0/0/4             0    -
       Ds1:0/0/8             0    -
       Ds1:0/0/12            0    -
       Ds1:0/0/16            0    -
       Ds1:0/0/20            0    -
```

Output columns

Field	**Description**
TG id	The tunnel group ID
Channel	The selected channel
TG state	The tunnel group state: enabled or disabled
Rule priority	The DSG rule priority configured
Vendor Param	The vendor-specific group configured

Related information

show cable dsg tunnel

show cable dsg tunnel

Use the `show cable dsg tunnel` command to display the tunnel MAC address, state, tunnel-group id, classifiers associated with the tunnel, and its state. This command also displays the number of interfaces to which a tunnel is associated, the clients associated, and the QoS service class name for all the configured tunnels.

`show cable dsg tunnel` [{ *tunnel-id* [`cfr` *cfr-id* | `clients` | `interfaces` | `statistics`] }]

Syntax description

tunnel-id	Displays information only about this specific tunnel
cfr-id	Displays information only about this specific classifier

Command mode

Exec mode.

Usage guidelines

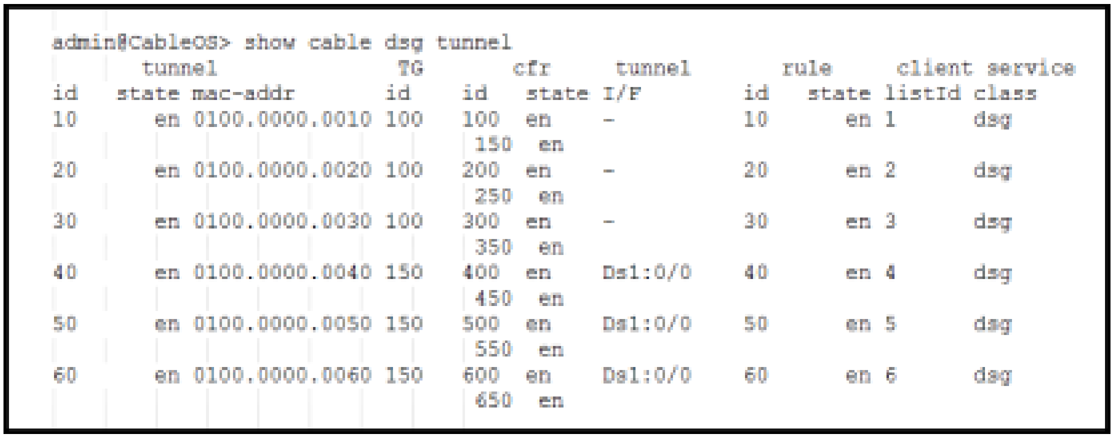
There are no additional Usage Guidelines for this command.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

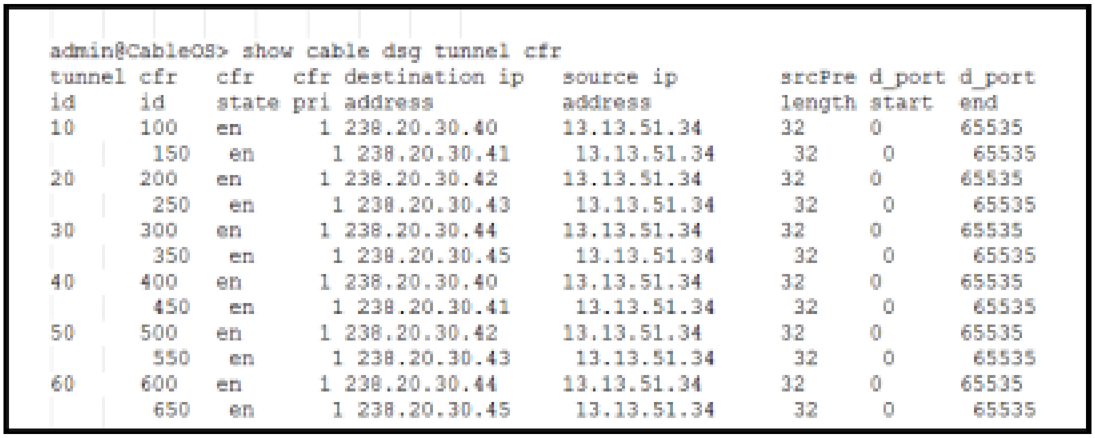
Examples

The following example displays the output for all tunnels:



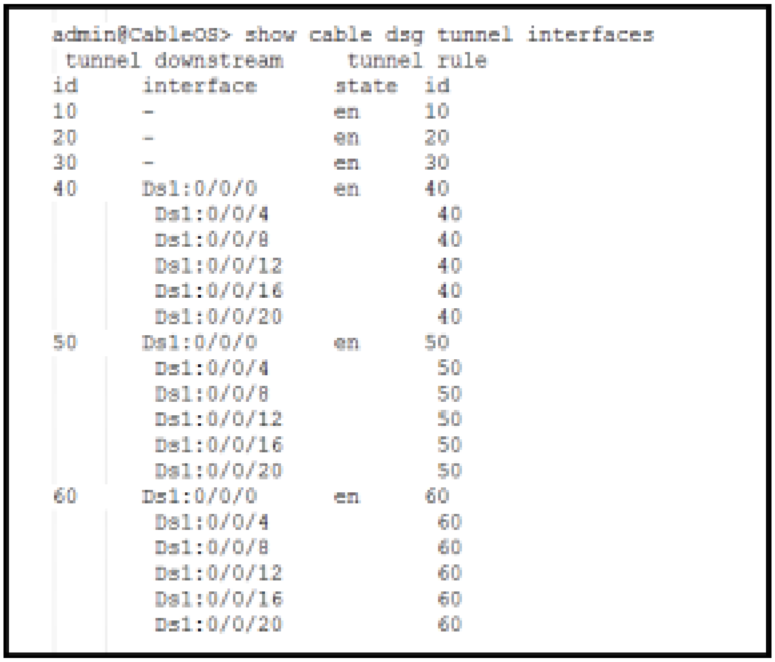
```
admin@CableOS> show cable dsg tunnel
       tunnel              TG       cfr     tunnel        rule     client service
id   state mac-addr       id    id   state I/F        id   state listId class
10      en 0100.0000.0010 100   100  en    -          10      en 1      dsg
                                 150  en
20      en 0100.0000.0020 100   200  en    -          20      en 2      dsg
                                 250  en
30      en 0100.0000.0030 100   300  en    -          30      en 3      dsg
                                 350  en
40      en 0100.0000.0040 150   400  en    Ds1:0/0    40      en 4      dsg
                                 450  en
50      en 0100.0000.0050 150   500  en    Ds1:0/0    50      en 5      dsg
                                 550  en
60      en 0100.0000.0060 150   600  en    Ds1:0/0    60      en 6      dsg
                                 650  en
```

The following example displays the output for all tunnel classifiers:



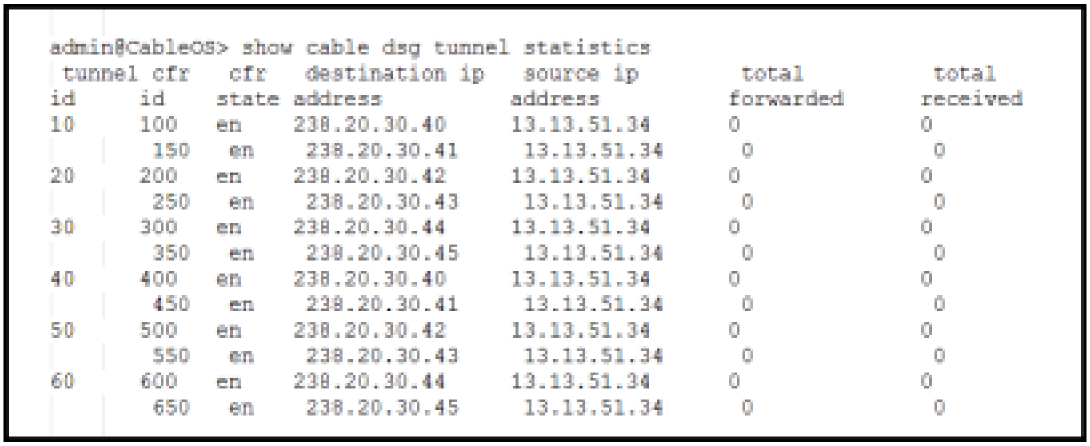
```
admin@CableOS> show cable dsg tunnel cfr
tunnel cfr    cfr   cfr destination ip    source ip          srcPre d_port d_port
id     id     state pri address           address            length start  end
10     100    en      1 238.20.30.40      13.13.51.34        32     0      65535
        150    en      1 238.20.30.41      13.13.51.34        32     0      65535
20     200    en      1 238.20.30.42      13.13.51.34        32     0      65535
        250    en      1 238.20.30.43      13.13.51.34        32     0      65535
30     300    en      1 238.20.30.44      13.13.51.34        32     0      65535
        350    en      1 238.20.30.45      13.13.51.34        32     0      65535
40     400    en      1 238.20.30.40      13.13.51.34        32     0      65535
        450    en      1 238.20.30.41      13.13.51.34        32     0      65535
50     500    en      1 238.20.30.42      13.13.51.34        32     0      65535
        550    en      1 238.20.30.43      13.13.51.34        32     0      65535
60     600    en      1 238.20.30.44      13.13.51.34        32     0      65535
        650    en      1 238.20.30.45      13.13.51.34        32     0      65535
```

The following example displays the output for all tunnel interfaces:



```
admin@CableOS> show cable dsg tunnel interfaces
 tunnel downstream     tunnel rule
id     interface       state  id
10     -               en     10
20     -               en     20
30     -               en     30
40     Ds1:0/0/0       en     40
        Ds1:0/0/4              40
        Ds1:0/0/8              40
        Ds1:0/0/12             40
        Ds1:0/0/16             40
        Ds1:0/0/20             40
50     Ds1:0/0/0       en     50
        Ds1:0/0/4              50
        Ds1:0/0/8              50
        Ds1:0/0/12             50
        Ds1:0/0/16             50
        Ds1:0/0/20             50
60     Ds1:0/0/0       en     60
        Ds1:0/0/4              60
        Ds1:0/0/8              60
        Ds1:0/0/12             60
        Ds1:0/0/16             60
        Ds1:0/0/20             60
```

The following example displays the output for all tunnel statistics:



```
admin@CableOS> show cable dsg tunnel statistics
 tunnel cfr    cfr   destination ip   source ip         total          total
id      id    state address          address          forwarded      received
10      100   en    238.20.30.40     13.13.51.34      0              0
         150   en    238.20.30.41     13.13.51.34      0              0
20      200   en    238.20.30.42     13.13.51.34      0              0
         250   en    238.20.30.43     13.13.51.34      0              0
30      300   en    238.20.30.44     13.13.51.34      0              0
         350   en    238.20.30.45     13.13.51.34      0              0
40      400   en    238.20.30.40     13.13.51.34      0              0
         450   en    238.20.30.41     13.13.51.34      0              0
50      500   en    238.20.30.42     13.13.51.34      0              0
         550   en    238.20.30.43     13.13.51.34      0              0
60      600   en    238.20.30.44     13.13.51.34      0              0
         650   en    238.20.30.45     13.13.51.34      0              0
```

Related information

show cable dsg tg

show cable dynamic-bonding-group

Use the `show cable dynamic-bonding-group` command to display information about dynamic bonding groups.

`show cable dynamic-bonding-group [` *dsVC:VS/PP:B* | *mdVC:VS/PP.0* `] [ summary` | `upstream`]

Syntax description

dsVC:VS/PP:B	Selects CMs belonging to 'cable mac-domain VC:VS/PP.0 ds-bonding group B'.
mdVC:VS/PP.0	Selects CMs belonging to 'cable mac-domain VC:VS/PP.0’.
`summary`	Displays dynamic bonding group information
`upstream`	Displays upstream dynamic bonding groups information

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example shows all the DS DBGs on the system:

```
admin@CableOS> show cable dynamic-bonding-group summary
Dynamic bonding group: Enable
MAC            BG         BG               BG        SERVICE CREATE              BG
          RF-CHANNEL
DOMAIN         ID         NAME             SIZE CMs  FLOWS   TIME
 STATE        LIST
-------------- ---------- ---------------- ---- ---- ------- -------------------
 ------------ ----------------
Md3:0/0.0      0x3000101  Ds3:0/0:Dyn1       16    1       1 2021-06-07 11:00:00
 OPERATIONAL  0-15
Md3:0/0.0      0x3000102  Ds3:0/0:Dyn2        8    2       2 2021-06-07 10:58:33
 OPERATIONAL  16-23
Md3:0/0.0      0x3000103  Ds3:0/0:Dyn3       25    2       2 2021-06-07 10:58:40
 OPERATIONAL  0-23,Of0
Md3:0/0.0      0x3000104  Ds3:0/0:Dyn4        8    1       1 2021-06-07 10:58:54
 OPERATIONAL  0-7
Md3:0/0.0      0x3000105  Ds3:0/0:Dyn5       24    2       2 2021-06-07 10:59:14
 OPERATIONAL  0-23
Md3:0/15.0     0x300f101  Ds3:0/15:Dyn1      26    6       6 2021-06-07 10:58:33
 OPERATIONAL  0-23,Of0,Of1
Md3:0/15.0     0x300f102  Ds3:0/15:Dyn2       8    3       3 2021-06-07 10:58:51
 OPERATIONAL  0-7
Md3:0/15.0     0x300f103  Ds3:0/15:Dyn3       8    3       3 2021-06-07 10:58:51
 OPERATIONAL  8-15
Md3:0/15.0     0x300f104  Ds3:0/15:Dyn4       8    3       3 2021-06-07 10:58:51
 OPERATIONAL  16-23
===================================================================================================
Command Total:          9                         23      23
```

The following example shows all the US DBGs on the system:

```
admin@CableOS> show cable dynamic-bonding-group upstream

 MAC           BONDING             US                  OFDMA
 DOMAIN        GROUP               CHAN LIST           CHAN LIST
 ------------  -------------------  ------------------  ------------------
 Md3:0/0.0     Us3:0/0:DYN-U2A      0-1                 -
 Md3:0/0.0     Us3:0/0:DYN-U2B      2-3                 -
 Md3:0/0.0     Us3:0/0:DYN-U2C      3-4                 -
 Md3:0/0.0     Us3:0/0:DYN-U3A      0-2                 -
 Md3:0/0.0     Us3:0/0:DYN-U3B      2-4                 -
 Md3:0/0.0     Us3:0/0:DYN-U4A      0-3                 1
 Md3:0/0.0     Us3:0/0:DYN-U4B      1-4                 1
 Md3:0/0.0     Us3:0/0:DYN-U4C      0-3                 0
 Md3:0/0.0     Us3:0/0:DYN-U4D      1-4                 0
 Md3:0/0.0     Us3:0/0:DYN-U4E      0-3                 0-1
 Md3:0/0.0     Us3:0/0:DYN-U4F      1-4                 0-1
 Md3:0/0.0     Us3:0/0:DYN-U4G      0-3                 -
 Md3:0/0.0     Us3:0/0:DYN-U4H      1-4                 -
 Md3:0/0.0     Us3:0/0:DYN-U5A      0-4                 1
 Md3:0/0.0     Us3:0/0:DYN-U5B      0-4                 0
 Md3:0/0.0     Us3:0/0:DYN-U5C      0-4                 0-1
 Md3:0/0.0     Us3:0/0:DYN-U5D      0-4                 -
 Md3:0/15.0    Us3:0/15:DYN-U2A     0-1                 -
 Md3:0/15.0    Us3:0/15:DYN-U2B     2-3                 -
 Md3:0/15.0    Us3:0/15:DYN-U2C     3-4                 -
 Md3:0/15.0    Us3:0/15:DYN-U3A     0-2                 -
 Md3:0/15.0    Us3:0/15:DYN-U3B     2-4                 -
 Md3:0/15.0    Us3:0/15:DYN-U4A     0-3                 1
 Md3:0/15.0    Us3:0/15:DYN-U4B     1-4                 1
 Md3:0/15.0    Us3:0/15:DYN-U4C     0-3                 0
 Md3:0/15.0    Us3:0/15:DYN-U4D     1-4                 0
 Md3:0/15.0    Us3:0/15:DYN-U4E     0-3                 0-1
 Md3:0/15.0    Us3:0/15:DYN-U4F     1-4                 0-1
 Md3:0/15.0    Us3:0/15:DYN-U4G     0-3                 -
 Md3:0/15.0    Us3:0/15:DYN-U4H     1-4                 -
 Md3:0/15.0    Us3:0/15:DYN-U5A     0-4                 1
 Md3:0/15.0    Us3:0/15:DYN-U5B     0-4                 0
 Md3:0/15.0    Us3:0/15:DYN-U5C     0-4                 0-1
 Md3:0/15.0    Us3:0/15:DYN-U5D     0-4                 -
 ==========================================================================
Command Total:                   34 BG
```

The following example shows information on a specific downstream DBG:

```
admin@CableOS> show cable dynamic-bonding-group Ds3:0/0:Dyn1 summary
Dynamic bonding group: Enable
MAC            BG         BG               BG        SERVICE CREATE              BG
          RF-CHANNEL
DOMAIN         ID         NAME             SIZE CMs  FLOWS   TIME
 STATE        LIST
-------------- ---------- ---------------- ---- ---- ------- -------------------
 ------------ --------------
Md3:0/0.0      0x3000101  Ds3:0/0:Dyn1       16    1       1 2021-06-07 11:00:00
 OPERATIONAL  0-15
====================================================================================================
Command Total:          1                          1       1
```

The following example shows all the DS DBGs on a specific MAC domain:

```
admin@CableOS> show cable dynamic-bonding-group Md3:0/15.0 summary
Dynamic bonding group: Enable
MAC            BG         BG               BG        SERVICE CREATE              BG
          RF-CHANNEL
DOMAIN         ID         NAME             SIZE CMs  FLOWS   TIME
 STATE        LIST
-------------- ---------- ---------------- ---- ---- ------- -------------------
 ------------ ----------------------------
Md3:0/15.0     0x300f101  Ds3:0/15:Dyn1      26    6       6 2021-06-07 10:58:33
 OPERATIONAL  0-23,Of0,Of1
Md3:0/15.0     0x300f102  Ds3:0/15:Dyn2       8    3       3 2021-06-07 10:58:51
 OPERATIONAL  0-7
Md3:0/15.0     0x300f103  Ds3:0/15:Dyn3       8    3       3 2021-06-07 10:58:51
 OPERATIONAL  8-15
```

```
Md3:0/15.0     0x300f104  Ds3:0/15:Dyn4       8    3       3 2021-06-07 10:58:51
 OPERATIONAL  16-23
====================================================================================================
Command Total:          4                        15       15
```

The following example shows all the US DBGs on a specific MAC domain:

```
admin@CableOS> show cable dynamic-bonding-group Md3:0/0.0 upstream

 MAC           BONDING              US                   OFDMA
 DOMAIN        GROUP                CHAN LIST            CHAN LIST
 ------------  -------------------  ------------------   ------------------
 Md3:0/0.0     Us3:0/0:DYN-U2A      0-1                  -
 Md3:0/0.0     Us3:0/0:DYN-U2B      2-3                  -
 Md3:0/0.0     Us3:0/0:DYN-U2C      3-4                  -
 Md3:0/0.0     Us3:0/0:DYN-U3A      0-2                  -
 Md3:0/0.0     Us3:0/0:DYN-U3B      2-4                  -
 Md3:0/0.0     Us3:0/0:DYN-U4A      0-3                  1
 Md3:0/0.0     Us3:0/0:DYN-U4B      1-4                  1
 Md3:0/0.0     Us3:0/0:DYN-U4C      0-3                  0
 Md3:0/0.0     Us3:0/0:DYN-U4D      1-4                  0
 Md3:0/0.0     Us3:0/0:DYN-U4E      0-3                  0-1
 Md3:0/0.0     Us3:0/0:DYN-U4F      1-4                  0-1
 Md3:0/0.0     Us3:0/0:DYN-U4G      0-3                  -
 Md3:0/0.0     Us3:0/0:DYN-U4H      1-4                  -
 Md3:0/0.0     Us3:0/0:DYN-U5A      0-4                  1
 Md3:0/0.0     Us3:0/0:DYN-U5B      0-4                  0
 Md3:0/0.0     Us3:0/0:DYN-U5C      0-4                  0-1
 Md3:0/0.0     Us3:0/0:DYN-U5D      0-4                  -
 =========================================================================
Command Total:                   17 BG
```

Output columns

Field	Description
MAC DOMAIN	MAC domain name
BG ID	Hex representation of the system dcs ID
BG NAME	DsVc:Vs/PP:Dyn{ ds-bonding group id}
BG SIZE	Total number of elements in the group
CMs	Total number of CMs assigned to group channels
SERVICE FLOWS	Total number of SFs assigned to group channels
CREATE TIME	The time that the DBG channel set was created
BG STATE	`OPERATIONAL` if the group is valid `RECLAIM_HOLD` if no modem is in use on the bonding group
RF-CHANNEL LIST	A list of the RF channels available in the DBG

Related information

cable mac-domain * controller dynamic-bg

cable mac-domain * ds-dynamic-bonding-group

cable mac-domain * us-dynamic-bonding-group

show cable filter

Use the `show cable filter` command to display the filter groups that are currently configured, with a single line per cable filter rule.

`show cable filter` [`group` *group-id* [`index` *index-num*]]

Syntax description

group-id	(Optional) Specifies the filter group to be displayed. The valid range is 1 to 256.
index-num	(Optional) Specifies the index of the particular filter within a group to be displayed. The valid range 1 to 256.

Command mode

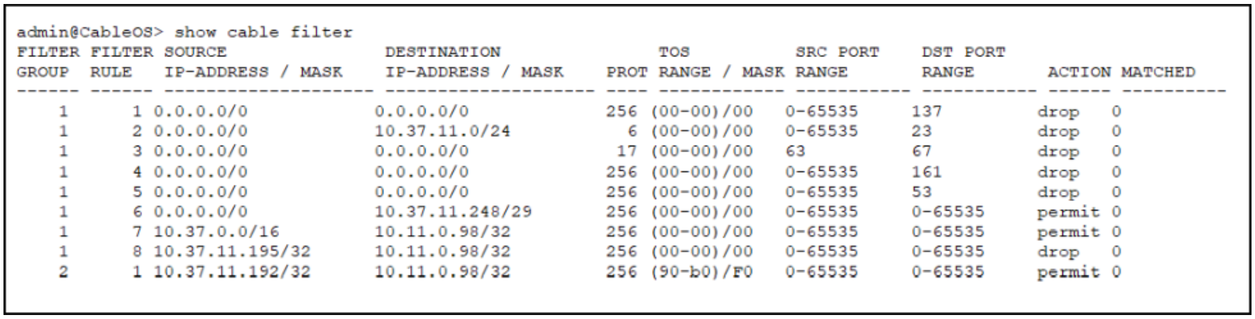
Exec mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example shows a typical output from the `show cable filter` command:



```
admin@CableOS> show cable filter
FILTER FILTER SOURCE               DESTINATION               TOS          SRC PORT    DST PORT
GROUP  RULE   IP-ADDRESS / MASK    IP-ADDRESS / MASK    PROT RANGE / MASK RANGE       RANGE       ACTION MATCHED
------ ------ -------------------- -------------------- ---- ------------ ----------- ----------- ------ ----------
    1      1 0.0.0.0/0            0.0.0.0/0             256 (00-00)/00   0-65535     137         drop   0
    1      2 0.0.0.0/0            10.37.11.0/24           6 (00-00)/00   0-65535     23          drop   0
    1      3 0.0.0.0/0            0.0.0.0/0              17 (00-00)/00   63          67          drop   0
    1      4 0.0.0.0/0            0.0.0.0/0             256 (00-00)/00   0-65535     161         drop   0
    1      5 0.0.0.0/0            0.0.0.0/0             256 (00-00)/00   0-65535     53          drop   0
    1      6 0.0.0.0/0            10.37.11.248/29       256 (00-00)/00   0-65535     0-65535     permit 0
    1      7 10.37.0.0/16         10.11.0.98/32         256 (00-00)/00   0-65535     0-65535     permit 0
    1      8 10.37.11.195/32      10.11.0.98/32         256 (00-00)/00   0-65535     0-65535     drop   0
    2      1 10.37.11.192/32      10.11.0.98/32         256 (90-b0)/F0   0-65535     0-65535     permit 0
```

Output columns

Field	Description
FILTER GROUP	The unique group ID for this filter group
FILTER RULE	The unique index ID for this filter group rule
SOURCE IP-ADDRESS/MASK	The IP and subnet mask for the source address
DESTINATION IP-ADDRESS/MASK	The IP and subnet mask for the destination address
PROT	The IP protocol type number
TOS RANGE / MASK	The IP ToS byte range settings

Field	Description
SRC PORT RANGE	The TCP/UDP source port start range
DST PORT RANGE	The TCP/UDP destination port start range
ACTION	The action taken for packets that match this filter
MATCHED	The number of packets that matched the filter

Related information

cable filter group

cable submgmt default active

cable submgmt default filter-group

cable submgmt default cpe-max-ipv4 cpe-max-ipv6

show cable flap-list

Use the `show cable flap-list` command to display flap-list information by the CM.

`show cable flap-list` [`sort-flaps` | `sort-time`] [*cable-interfaces* | *cm-mac*]

Syntax description

cable-interfaces	Selects the cable modems on one or more cable side interfaces.
cm-mac	The MAC address of a specific CM.
`sort-time`	Displays the output sorted in increasing order of elapsed time since the last flap on the CM.
`sort-flaps`	Displays the output sorted in decreasing order of flap count on the CM.

Command mode

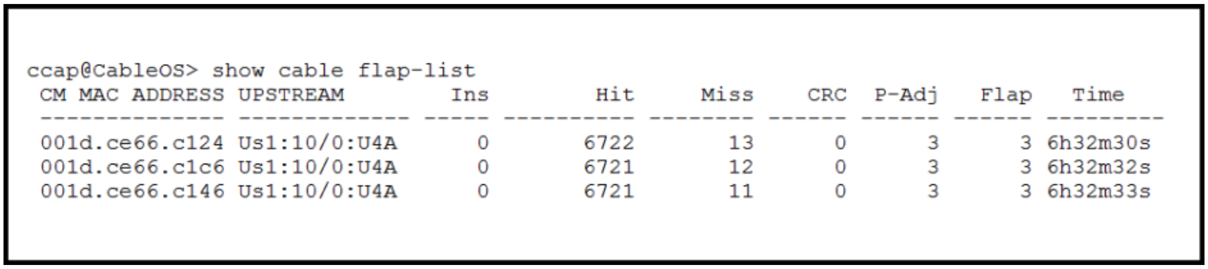
Exec mode.

Usage guidelines

The sort options operate differently on the different CMTS routers.

Example

The following example shows all the current contents of the flap list in the `show cable flap-list` command:



```
ccap@CableOS> show cable flap-list
 CM MAC ADDRESS UPSTREAM        Ins        Hit      Miss    CRC  P-Adj   Flap    Time
 -------------- ------------- ----- ---------- --------- ------ ------ ------ ---------
 001d.ce66.c124 Us1:10/0:U4A      0       6722        13      0      3      3 6h32m30s
 001d.ce66.c1c6 Us1:10/0:U4A      0       6721        12      0      3      3 6h32m32s
 001d.ce66.c146 Us1:10/0:U4A      0       6721        11      0      3      3 6h32m33s
```

Output columns

Field	Description
CM MAC Address	The Ethernet MAC address of the cable modem
Upstream	Upstream channel or bonding group of the CM's transmit channel set
Ins	Number of "insertion" flaps since the flap-list was cleared. An insertion flap is when a CM fails to initially register and repeats its initial ranging request in less time than the configured `cable flap-list insertion-time` seconds.
Hit	Number of times the CM sent a station maintenance ranging request since the flap-list was cleared
Miss	Number of times the CM failed to send a station maintenance (SM) request when offered an SM opportunity. The CMTS schedules an SM opportunity every `cable mac-domain * sm-interval-sec` seconds.
CRC	Number of Cyclic Redundancy Check (CRC) errors detected on upstream packets from the modem
P-adj	Number of power adjustments sent to the CM in a ranging response
Flap	Sum of insertion flaps ("Ins" column) and power-adjusts ("P-Adj") column. A higher flap rate is an indication of more severe upstream physical layer impairments.
Time	The time since the CM's last flap event (insertion or power adjustment)

show cable flap-sum

Use the `show cable flap-sum` command to show a summary of cable modem instability.

`show cable flap-sum` [{ *cable-interfaces single-cm multiple-cm*] [`| sort-flaps | sort-time`] [`| all` }]

Syntax description

cable-interfaces	Selects cable modems on one or more cable side interfaces.

single-CM	Selects a single CM.
multiple-CM	Selects multiple CMs.

Default

With no argument for cable-interfaces, single-cm, or multiple-cm, the CMTS selects for display all CMs on all MAC domains.

With neither the “sort-flaps” or “sort-time” argument, the CMTS displays the selected CMs sorted by MAC domain in increasing order of CM MAC address.

Command mode

Exec mode.

Usage guidelines

The CMTS considers a CM to “flap” when it goes off-line or re-initializes while not off-line. The CMTS recognizes distinct categories of flap events:

- “Forced flaps” are when the CMTS discontinues station maintenance ranging and immediately marks the CM as off-line.
- “Range flaps” are when a CM that is not off-line fails to send range requests for 16 consecutive schedule station maintenance opportunities.
- “Init flaps” are when a CM that is not off-line sends an initial ranging request.

The total flap count of a CM is the sum of these counts.

There are several cases where the CMTS forces a CM to re-initialize with a “forced flap”:

- A “clear cable modem” command
- A “no cable …” or “… admin-state down” CLI command that destroys or administratively disables items required for CM operation (slots, ports, channels, us-logical-channels, bonding-groups, etc.)
- A downstream frequency override initial ranging response
- A T10 timeout (failure of CM to complete registration)
- A UCC, DCC, or DBC MAC management message with init-technique 0
- A CLI change to the channels in a ds-bonding-group or us-bonding-group, in order to force the CMs to learn the new bonding group channels when they re-register

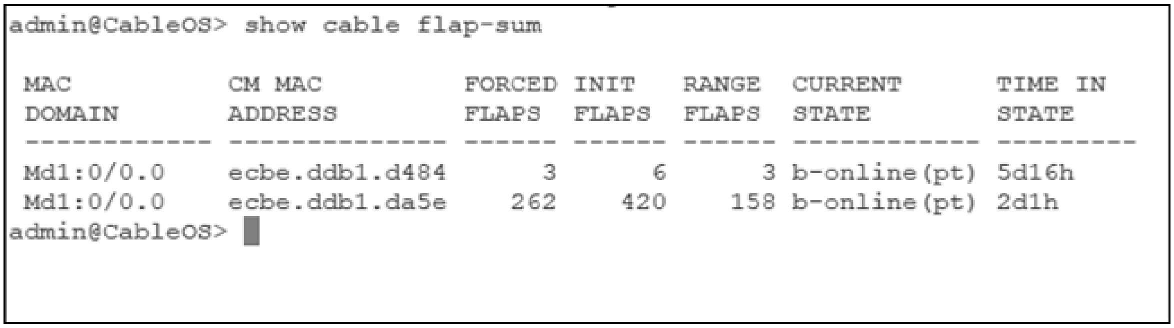
NOTE:

Some CLI commands may indirectly cause CMs to deregister by changing the physical layer of downstream or upstream transmission. An example is a CLI command changing the power level of a downstream channel. In these cases, the CMTS detects modems have deregistered only by failing to receive upstream station maintenance range requests (a “range flap”) or by receiving an initial ranging request from the CM (an “init flap”).

Example

The following example shows a summary of the information for all cable modems from the flap list:

```
show cable flap-sum
```



```
admin@CableOS> show cable flap-sum

 MAC          CM MAC         FORCED INIT   RANGE  CURRENT      TIME IN
 DOMAIN       ADDRESS        FLAPS  FLAPS  FLAPS  STATE        STATE
 ------------ -------------- ------ ------ ------ ------------ ---------
 Md1:0/0.0    ecbe.ddb1.d484      3      6      3 b-online(pt) 5d16h
 Md1:0/0.0    ecbe.ddb1.da5e    262    420    158 b-online(pt) 2d1h
admin@CableOS> █
```

Output columns

Field	**Description**
MAC DOMAIN	MAC domain of the modem
CM MAC Address	MAC address of the modem
FORCED FLAPS	The number of times the CMTS forced the CM into the off-line state and discontinued station maintenance ranging opportunities
INIT FLAPS	The number of times the CMTS received an initial ranging request from the CM when it was not in the offline state
RANGE FLAPS	The number of times the CMTS transitioned the CM to the off-line state because it failed to received a range request from the CM for 16 consecutive station maintenance opportunities
CURRENT STATE	Current CM state as reported by the *show cable modem* command
TIME IN STATE	The time since the CMTS changed the CM to its current state. The time is expressed as XXhXXmXXs if less than 24 hours or XXXXdxxh if more than 24 hours.

Related information

clear cable flap-list

show cable hop

Use the `show cable hop` monitoring command to display the actively selected upstream modulation profile for a given upstream logical channel.

`show cable hop` < *us-interface* >

Syntax description

us-interface	Upstream interface. Can be one of: • mdVC:VS/PP.0: MAC domain • usVC:VS/PP/C: upstream physical channel • usVC:VS/PP/C.L: upstream logical channel • usVC:VS/PP: upstream port

Default

There is no default for this command.

Command mode

Exec mode.

Usage guidelines

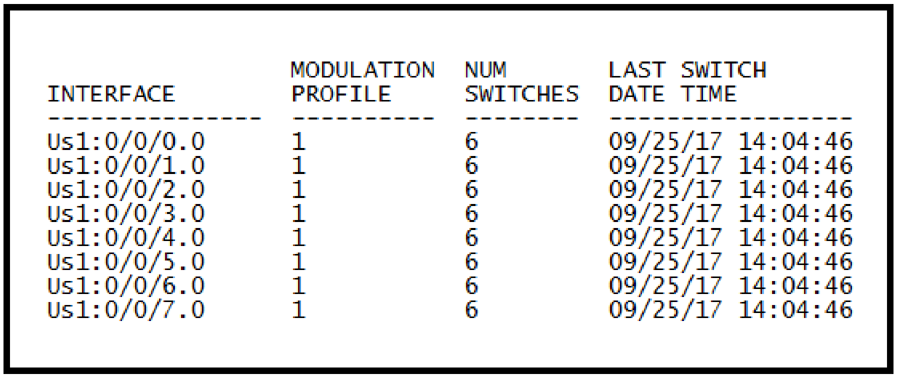
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Example

The following example shows a summary of the information for all cable modems from the flap list:

```
show cable hop
```



```
                MODULATION  NUM       LAST SWITCH
INTERFACE       PROFILE     SWITCHES  DATE TIME
--------------- ----------  --------  -----------------
Us1:0/0/0.0     1           6         09/25/17 14:04:46
Us1:0/0/1.0     1           6         09/25/17 14:04:46
Us1:0/0/2.0     1           6         09/25/17 14:04:46
Us1:0/0/3.0     1           6         09/25/17 14:04:46
Us1:0/0/4.0     1           6         09/25/17 14:04:46
Us1:0/0/5.0     1           6         09/25/17 14:04:46
Us1:0/0/6.0     1           6         09/25/17 14:04:46
Us1:0/0/7.0     1           6         09/25/17 14:04:46
```

Output columns

Field	Description
Interfaces	Specifies the upstream logical channel
Modulation Profile	Specifies the active used modulation profile
Num Switches	Specifies the number of modulation profile switches for the channel
Last switch date and time	Specifies the date and time of the last switch

show cable hop history

To get the hopping history of the selected upstream modulation profiles for a given upstream logical channel, use the `show cable hop history` command:

`show cable hop` *us-log-channel* `history`

Syntax description

us-log-channel	<usVC:VS/PP/C.L> where: • VC – chassis • CS – slot • PP – US RF Port • C – US PHY Channel • L – Logical channel index (always 0)

Default

There is no default for this command.

Command mode

Exec mode.

Usage guidelines

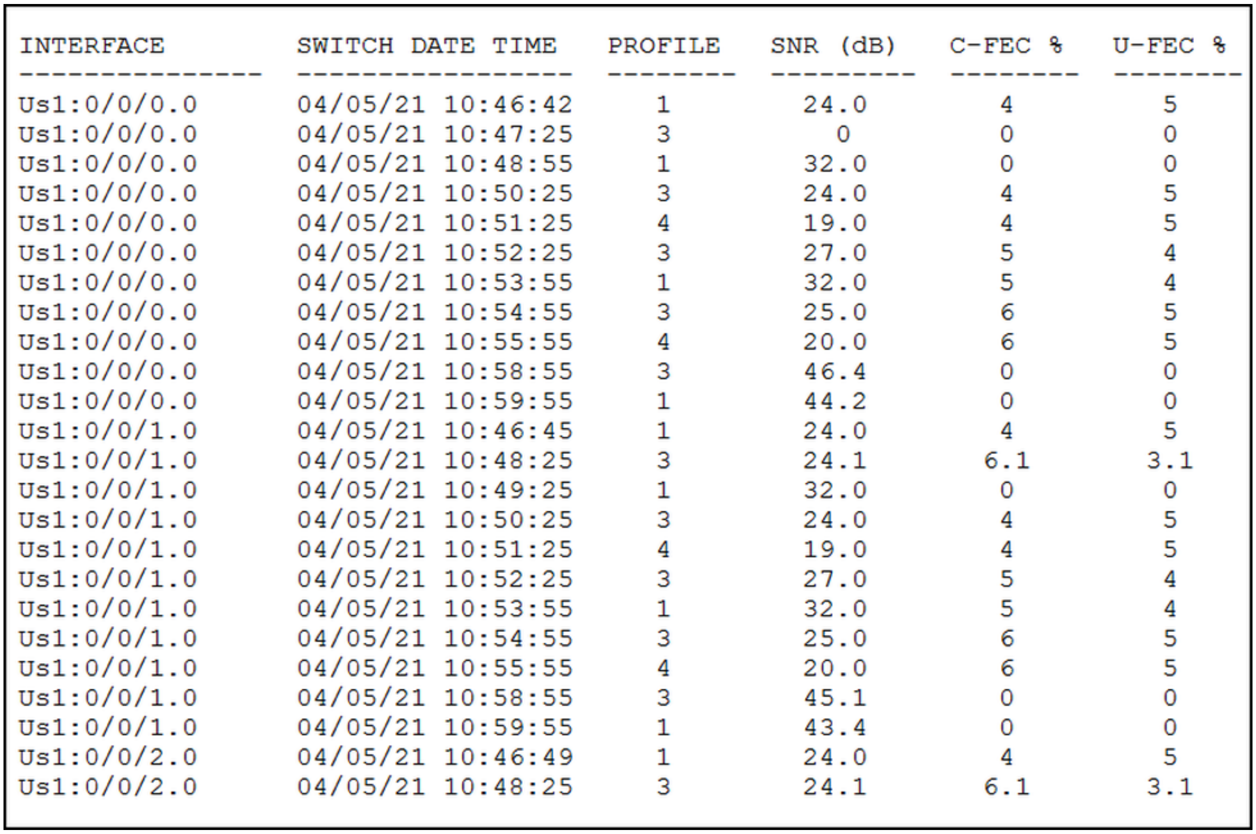
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ----------------------------------------------------------------------------
 x
```

Examples

The following example shows a summary of the information for all cable modems from the flap list:

```
show cable hop history
```



```
INTERFACE          SWITCH DATE TIME    PROFILE   SNR (dB)    C-FEC %   U-FEC %
----------------   -----------------   --------  ---------   --------  --------
Us1:0/0/0.0        04/05/21 10:46:42      1        24.0         4         5
Us1:0/0/0.0        04/05/21 10:47:25      3         0           0         0
Us1:0/0/0.0        04/05/21 10:48:55      1        32.0         0         0
Us1:0/0/0.0        04/05/21 10:50:25      3        24.0         4         5
Us1:0/0/0.0        04/05/21 10:51:25      4        19.0         4         5
Us1:0/0/0.0        04/05/21 10:52:25      3        27.0         5         4
Us1:0/0/0.0        04/05/21 10:53:55      1        32.0         5         4
Us1:0/0/0.0        04/05/21 10:54:55      3        25.0         6         5
Us1:0/0/0.0        04/05/21 10:55:55      4        20.0         6         5
Us1:0/0/0.0        04/05/21 10:58:55      3        46.4         0         0
Us1:0/0/0.0        04/05/21 10:59:55      1        44.2         0         0
Us1:0/0/1.0        04/05/21 10:46:45      1        24.0         4         5
Us1:0/0/1.0        04/05/21 10:48:25      3        24.1        6.1       3.1
Us1:0/0/1.0        04/05/21 10:49:25      1        32.0         0         0
Us1:0/0/1.0        04/05/21 10:50:25      3        24.0         4         5
Us1:0/0/1.0        04/05/21 10:51:25      4        19.0         4         5
Us1:0/0/1.0        04/05/21 10:52:25      3        27.0         5         4
Us1:0/0/1.0        04/05/21 10:53:55      1        32.0         5         4
Us1:0/0/1.0        04/05/21 10:54:55      3        25.0         6         5
Us1:0/0/1.0        04/05/21 10:55:55      4        20.0         6         5
Us1:0/0/1.0        04/05/21 10:58:55      3        45.1         0         0
Us1:0/0/1.0        04/05/21 10:59:55      1        43.4         0         0
Us1:0/0/2.0        04/05/21 10:46:49      1        24.0         4         5
Us1:0/0/2.0        04/05/21 10:48:25      3        24.1        6.1       3.1
```

Output columns

Field	Description
Interface	Specifies the upstream logical channel
Switch Date Time	Specifies the date and time of the switch
Profile	Specifies the selected modulation profile

show cable latency history

Use the `show cable latency history` command to display the latency history of the MAC domain.

`show cable latency` *mac-domain* `history` [`max-length` *max-length*]

Syntax description

mac-domain	md vc:vs/pp.d. Specific MAC domain for which to provide the latency history.
max-length	(Optional) The maximum number of entries to show on the output. The default value is 32.

Default

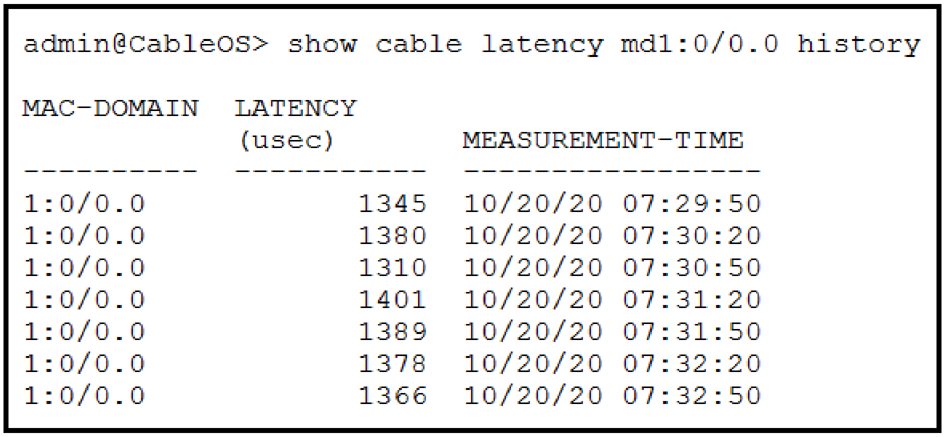
See the Syntax Description section for defaults.

Command mode

Exec mode

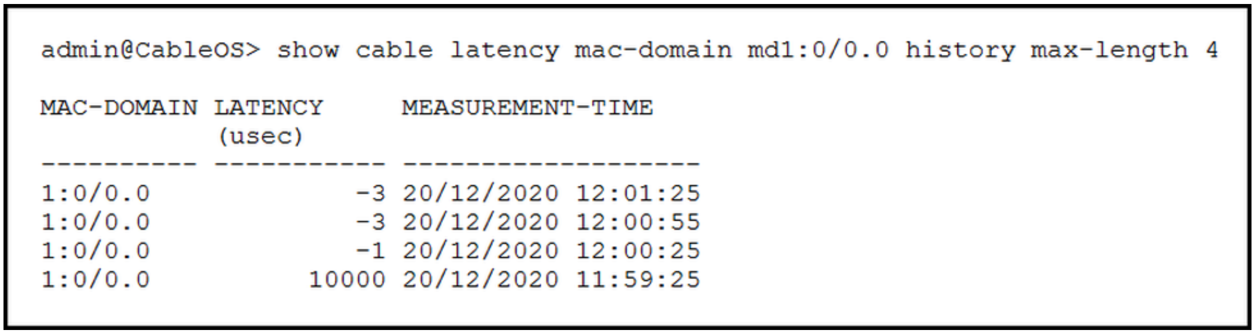
Examples

The following example shows all the latency history for a specific MAC domain:



```
admin@CableOS> show cable latency md1:0/0.0 history

MAC-DOMAIN  LATENCY
            (usec)       MEASUREMENT-TIME
----------  -----------  -----------------
1:0/0.0            1345  10/20/20 07:29:50
1:0/0.0            1380  10/20/20 07:30:20
1:0/0.0            1310  10/20/20 07:30:50
1:0/0.0            1401  10/20/20 07:31:20
1:0/0.0            1389  10/20/20 07:31:50
1:0/0.0            1378  10/20/20 07:32:20
1:0/0.0            1366  10/20/20 07:32:50
```

The following example shows the last four entries of the latency history for a specific MAC domains:



```
admin@CableOS> show cable latency mac-domain md1:0/0.0 history max-length 4

MAC-DOMAIN LATENCY     MEASUREMENT-TIME
           (usec)
---------- ----------- -------------------
1:0/0.0             -3 20/12/2020 12:01:25
1:0/0.0             -3 20/12/2020 12:00:55
1:0/0.0             -1 20/12/2020 12:00:25
1:0/0.0          10000 20/12/2020 11:59:25
```

Related information

show cable map-advance

show cable map-advance history

cable mac-domain * map-advance algorithm

cable mac-domain * map-advance

snmp-server enable traps core md-map-advance-changed

show cable load-balance

To display real time load balancing statistics, use the `show cable load-balance` command:

```
show cable load-balance
```

Default

There is no default for this command.

Command mode

Exec mode.

Usage guidelines

This command provides aggregated real-time statistics about dynamic load-balancing and may be used for troubleshooting by the support team. Note that in the case of multiple LCCEs distributed among different services, this command will aggregate information from all the servers. Statistics in this command can be cleared using the *clear cable load-balance* command.

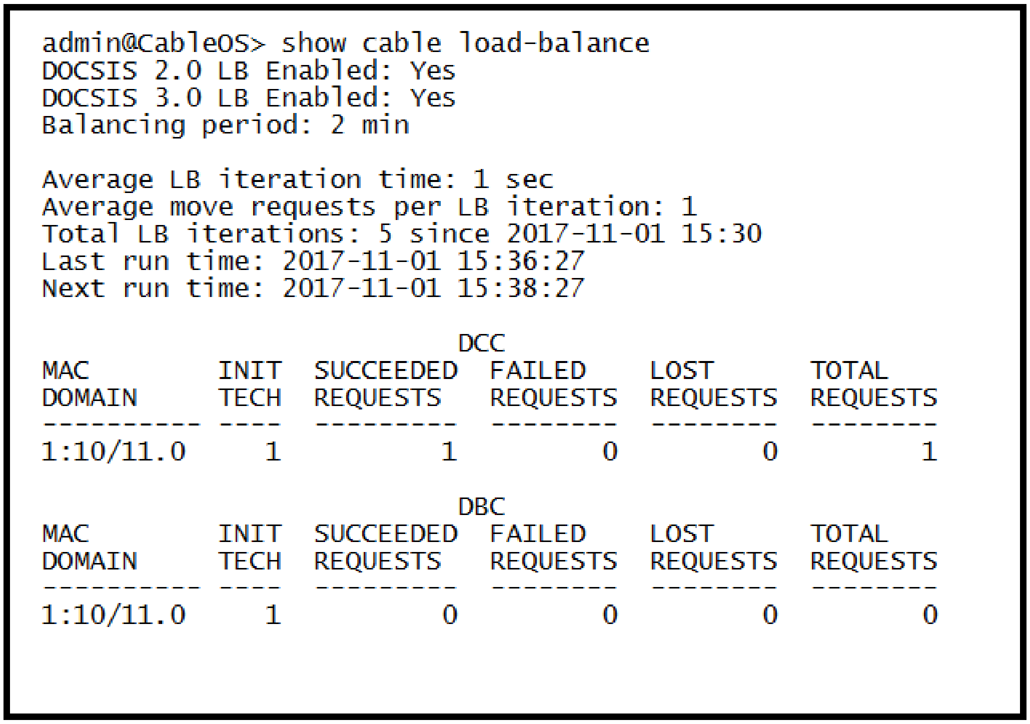
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Example

The following example shows load balance statistics:

```
show cable load-balance
```



```
admin@CableOS> show cable load-balance
DOCSIS 2.0 LB Enabled: Yes
DOCSIS 3.0 LB Enabled: Yes
Balancing period: 2 min

Average LB iteration time: 1 sec
Average move requests per LB iteration: 1
Total LB iterations: 5 since 2017-11-01 15:30
Last run time: 2017-11-01 15:36:27
Next run time: 2017-11-01 15:38:27

                          DCC
MAC         INIT  SUCCEEDED  FAILED    LOST      TOTAL
DOMAIN      TECH  REQUESTS   REQUESTS  REQUESTS  REQUESTS
----------  ----  ---------  --------  --------  --------
1:10/11.0      1          1         0         0         1

                          DBC
MAC         INIT  SUCCEEDED  FAILED    LOST      TOTAL
DOMAIN      TECH  REQUESTS   REQUESTS  REQUESTS  REQUESTS
----------  ----  ---------  --------  --------  --------
1:10/11.0      1          0         0         0         0
```

Output columns

Field	**Description**
Enabled	Indicates whether load balancing is enabled
Balancing period	Shows the time period between dynamic load balancing iterations
Average LB iteration time	Shows the average time needed to perform the load balancing procedure May be used for troubleshooting purposes.
Average move requests per LB iteration	Shows the average number of cable-modem moves (DBC/ DCC requests) per load balancing iteration. In case of multiple servers, each server has its own load balancing iteration, so if the first server had 2 moves, while no moves occurred on the second, the average will be 1 iteration.
Total LB iterations	Shows the total number of cable modem moves (DBC/DCC requests) since the specified time. This time point can be updated using the *clear cable load-balance state* command.
Last run time	Shows the last LB iteration time
Next run time	Shows the next LB iteration time
Mac Domain	The MAC domain name.
Init Tech	The init technique used for DBC/DCC messages
Succeeded requests	The number of successful DBC/DCC moves

Field	Description
Failed requests	The number of DBC/DCC moves that finished with a response from the cable modem with a fail status
Lost requests	The number of DBC/DCC requests that the cable modem did not answer
Total requests	The total number of DBC/DCC requests

Related information

cable load-balance
cable load-balance balancing-period secs
cable load-balance exclude
cable load-balance fail-exclude-period-secs
cable load-balance move-exclude-period-secs
cable load-balance threshold deviation-enhancement
cable load-balance threshold load-value
cable load-balance threshold min-chan-load
clear cable load-balance
show cable load-balance exclude-list
show cable load-balance distribution

show cable load-balance distribution

Use the `show cable load-balance distribution` command to display general load balance information per MAC domain.

`show cable load-balance distribution [` *mdVC:VS/PP.0* `] { upstream | downstream } [ verbose ]`

Syntax description

mdVC:VS/PP.0	Selects CMs belonging to 'cable mac-domain VC:VS/PP.0’.
`upstream`	Shows information about the upstream.
`downstream`	Shows information about the downstream.
`verbose`	Shows detailed information.

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 -----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 -----------------------------------------------------------------------------
 x
```

Examples

The following example shows general load balancing information for the downstream:

```
admin@CableOS> show cable load-balance distribution downstream

MAC            MIN        MAX        MEAN       STDEV
DOMAIN         CM COUNT   CM COUNT   CM COUNT   CM COUNT
-------------- ---------- ---------- ---------- ----------
Md1:0/0.0      1          17         14.394     2.839
Md2:0/0.0      1          18         16.44      3.229
Md3:0/0.0      0          0          0          0.0
Md4:0/0.0      0          51         45.03      8.233
Md5:0/0.0      0          50         46         8.344
```

The following example shows general load balancing information for the upstream:

```
admin@CableOS> show cable load-balance distribution upstream

MAC            MIN        MAX        MEAN       STDEV
DOMAIN         CM COUNT   CM COUNT   CM COUNT   CM COUNT
-------------- ---------- ---------- ---------- ----------
Md1:0/0.0      0          57         45.2       25.273
Md2:0/0.0      0          50         39.6       22.143
Md3:0/0.0      0          0          0          0.0
Md4:0/0.0      0          187        149.2      83.407
Md5:0/0.0      0          193        153.4      85.757
```

The following example shows general load balancing information for the downstream on a specific MAC domain:

```
admin@CableOS> show cable load-balance distribution Md2:0/0.0 downstream

MAC            MIN        MAX        MEAN       STDEV
DOMAIN         CM COUNT   CM COUNT   CM COUNT   CM COUNT
-------------- ---------- ---------- ---------- ----------
Md2:0/0.0      1          18         16.44      3.229
```

The following example shows general load balancing information for the upstream on a specific MAC domain:

```
admin@CableOS> show cable load-balance distribution Md5:0/0.0 upstream
```

```
MAC            MIN         MAX         MEAN        STDEV
DOMAIN         CM COUNT    CM COUNT    CM COUNT    CM COUNT
-------------- ----------- ----------- ----------- -----------
Md5:0/0.0      0           193         153.4       85.757
```

The following example shows the CM count for each channel in each MAC domain in the upstream:

```
admin@CableOS> show cable load-balance distribution Md2:0/0.0 upstream verbose

MAC            US        CM     ADMIN
DOMAIN         RF-CHAN   COUNT  STATE
-------------- --------- ------ ------
Md2:0/0.0
               0         49     active
               1         50     active
               2         50     active
               3         49     active
               Of0       0      down
```

The following example shows the CM count for each channel in each MAC domain in the downstream:

```
admin@CableOS> show cable load-balance distribution Md2:0/0.0 downstream  verbose

MAC            DS        CM     ADMIN
DOMAIN         RF-CHAN   COUNT  STATE
-------------- --------- ------ ------
Md2:0/0.0
               0         17     active
               1         17     active
               2         17     active
               3         17     active
               4         18     active
               5         17     active
               6         17     active
               7         17     active
               8         18     active
               Of0       1      active
```

Output columns

Field	**Description**
MAC DOMAIN	The MAC Domain for the cable modem
MIN CM COUNT	The minimum number of CMs per channel in the corresponding MAC domain
MAX CM COUNT	The maximum number of CMs per channel in the corresponding MAC domain
MEAN CM COUNT	The mean number of CMs per channel in the corresponding MAC domain
STDEV CM COUNT	The standard deviation of numbers of CMs per channel in the corresponding MAC domain
DS/US RF-CHAN	The Downstream/Upstream channel index
CM COUNT	The number of CMs on the corresponding rf-channel
ADMIN STATE	The channel's admin state

Related information

cable load-balance

show cable load-balance

test cable dbc

test cable dcc

show cable load-balance exclude-list

To display a list of cable modems that were excluded from Dynamic Load Balancing, use the `show cable load-balance exclude-list` command:

```
show cable load-balance exclude-list
```

Default

There is no default for this command.

Command mode

Exec mode.

Usage guidelines

This command displays a list of cable modems that were excluded from Dynamic Load Balancing for any reason. If a cable modem was moved in both upstream and downstream directions during a single DLB iteration, only the latest exclude reason will be displayed by this command. The exclude list can be cleared by the *clear cable load-balance* command (except for cable modems already excluded in the CLI configuration).

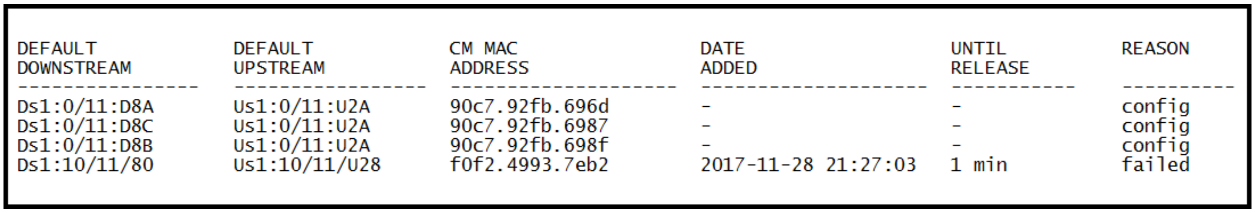
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example shows the list of cable modems that were excluded from Dynamic Load Balancing:

```
show cable load-balance exclude-list
```



```
DEFAULT           DEFAULT           CM MAC              DATE                UNTIL        REASON
DOWNSTREAM        UPSTREAM          ADDRESS             ADDED               RELEASE
----------------- ----------------- ------------------- ------------------- -----------  ----------
Ds1:0/11:D8A      Us1:0/11:U2A      90c7.92fb.696d      -                   -            config
Ds1:0/11:D8C      Us1:0/11:U2A      90c7.92fb.6987      -                   -            config
Ds1:0/11:D8B      Us1:0/11:U2A      90c7.92fb.698f      -                   -            config
Ds1:10/11/80      Us1:10/11/U28     f0f2.4993.7eb2      2017-11-28 21:27:03 1 min        failed
```

Output columns

Field	Description
Default Downstream	Shows the cable modem downstream bonding group
Default Upstream	Shows the cable modem upstream bonding group
CM Mac Address	Shows the cable modem MAC address
Date Added	Shows the date and time when the cable modem was added to the DLB exclude list (only for cable modems excluded with the reason 'moved' or 'failed')
Until Release	Shows the time left until the cable modem is automatically removed from the exclude list
Reason	Provides short information about the reason for exclusion: • config - excluded manually in cli config • moved - the cable modem was recently successfully moved in the scope of DLB. (The exclude period may be configured in CLI). Can be removed from the exclude list manually with the *clear cable load-balance* command. • failed - The cable modem failed to move recently in the scope of DLB. (The exclude period may be configured in CLI.) • ugs - The cable modem has dynamic service flow • policy - The cable modem was excluded by a DOCSIS policy

Related information

cable load-balance rule

cable load-balance docsis-policy

cable load-balance downstream frequency-setting dynamic-lb

cable load-balance downstream frequency-setting static-lb

cable load-balance upstream channel-id-setting dynamic-lb

cable load-balance upstream channel-id-setting static-lb

cable load-balance

cable load-balance balancing-period secs

cable load-balance exclude

cable load-balance fail-exclude-period-secs

cable load-balance move-exclude-period-secs

cable load-balance threshold deviation-enhancement

cable load-balance threshold load-value

cable load-balance threshold min-chan-load

clear cable load-balance

show cable load-balance group summary

To display the number of CMs for each load balance group, use the `show cable load-balance` command:

```
show cable load-balance group summary
```

Syntax description

This command has no arguments or keywords.

Default

There is no default for this command.

Command mode

Exec mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

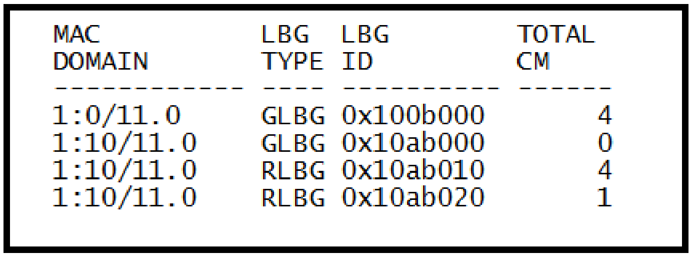
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ---------------------------------------------------------------------------
 x
```

Example

The following example shows load balance group information for every MAC domain on the chassis:

```
show cable load-balance group summary
```



```
MAC          LBG  LBG        TOTAL
DOMAIN       TYPE ID         CM
------------ ---- ---------- ------
1:0/11.0     GLBG 0x100b000       4
1:10/11.0    GLBG 0x10ab000       0
1:10/11.0    RLBG 0x10ab010       4
1:10/11.0    RLBG 0x10ab020       1
```

Output columns

Field	**Description**
MAC DOMAIN	The MAC domain for this CM
LBG TYPE	The type of load balancing group: restricted load balancing group (RLBG)/ general load balancing group (GLBG)
LBG ID	Hex representation of the Load Balancing Group ID
TOTAL CM	The number of CMs on the corresponding load-balance group

Related information

cable load-balance general default

cable mac-domain * load-balance restricted

show cable load-balance group restricted

show cable modem load-balance group

show cable load-balance group restricted

To display general information about existing restricted load balance groups (RLBGs) and their service types, use the `show cable load-balance group restricted` command:

`show cable load-balance group restricted` [*rlbg-cfg-index*] [`summary`]

Syntax description

rlbg-cfg-index	(Optional) The configuration index of the RLBG.
`summary`	(Optional) Shows information for each RLBG instead of for each service type.

Default

There is no default for this command.

Command mode

Exec mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ----------------------------------------------------------------------------
 x
```

Examples

The following example shows restricted load balance group information for all service types:

```
show cable load-balance group restricted
```

```
admin@CableOS> show cable load-balance group restricted

MAC            LBG CFG LBG        CONTROL  INIT SERVICE          TOTAL
DOMAIN         ID      ID         STATUS   TECH TYPE ID          CM
-------------- ------- ---------- -------- ---- ---------------- ------
1:0/0.0              1 0x1000010  ENABLED     2 rlbg_test1            6
```

The following example shows restricted load balance group information for RLBG number 1:

```
show cable load-balance group restricted 1
```

```
admin@CableOS> show cable load-balance group restricted 1

MAC            LBG CFG LBG        CONTROL  INIT SERVICE          TOTAL
DOMAIN         ID      ID         STATUS   TECH TYPE ID          CM
-------------- ------- ---------- -------- ---- ---------------- ------
1:0/0.0              1 0x1000010  ENABLED     2 rlbg_test1            6
```

The following example shows summary restricted load balance group information:

```
show cable load-balance group restricted summary
```

```
admin@CableOS> show cable load-balance group restricted summary

MAC            LBG CFG LBG        CONTROL  INIT TOTAL
DOMAIN         ID      ID         STATUS   TECH CM
-------------- ------- ---------- -------- ---- ------
1:0/0.0              1 0x1000010  ENABLED     2      6
======================================================
Command Total:                                  6 CM
```

Output columns

Field	**Description**
MAC DOMAIN	The MAC domain for this CM
LBG CFG ID	The configuration index of the RLBG
LBG ID	Hex representation of the Load Balancing Group ID
CONTROL STATUS	Enabled/Disabled load-balancing for this particular RLBG
INIT TECH	Init tech for dbc/dcc messages for this particular RLBG
SERVICE TYPE ID	Service type ID, used to assign modems to this RLBG
TOTAL CM	The number of CMs on the corresponding load-balance group

Related information

cable load-balance general default
cable mac-domain * load-balance restricted
show cable load-balance group summary
show cable modem load-balance group

show cable l2-vpn dot1q-vc-map

Use the `show cable l2-vpn dot1q-vc-map` command to display the association of a cable modem with a given static IP or MAC address to a specific VLAN.

```
show cable l2-vpn dot1q-vc-map{cm-mac  | vpn-id}
```

Syntax description

`cm-mac`	(Optional) Use to display VLAN information for a specific MAC address.
`vpn-id`	(Optional) Use to display VLAN information for a specific VLAN.

Command mode

Exec mode.

Usage guidelines

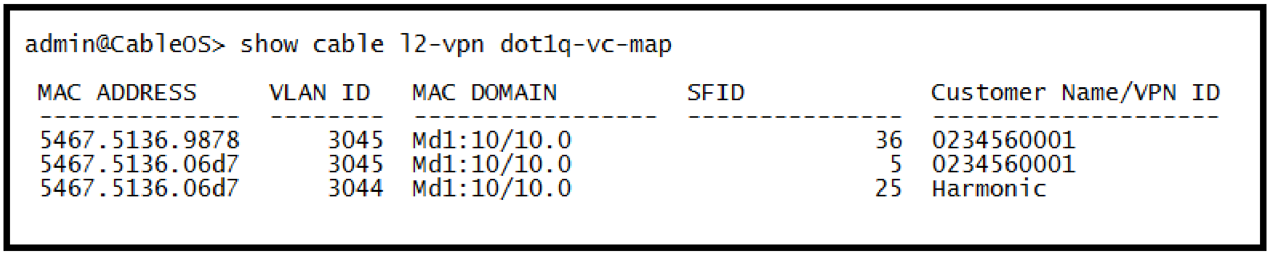
This command is useful to provide information for Business Services over DOCSIS (BSOD) applications.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 -----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 -----------------------------------------------------------------------------
 x
```

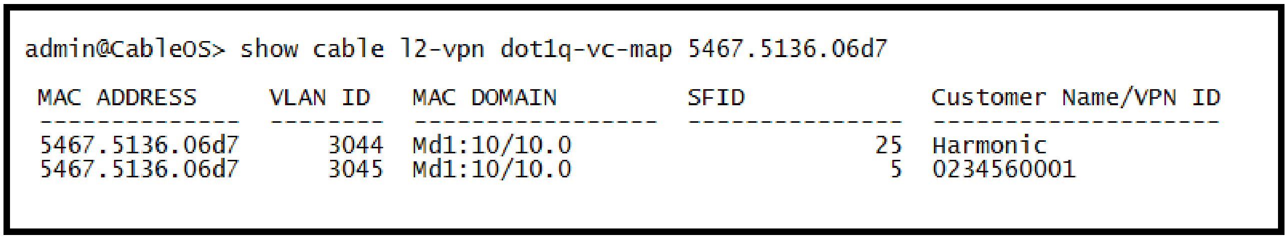
Examples

The following example displays the association for all cable modems on the node:



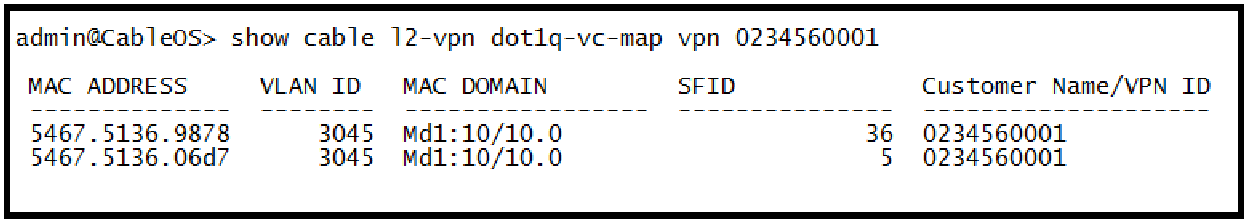
```
admin@CableOS> show cable l2-vpn dot1q-vc-map

 MAC ADDRESS     VLAN ID   MAC DOMAIN         SFID              Customer Name/VPN ID
 --------------  --------  -----------------  ----------------  --------------------
 5467.5136.9878      3045  Md1:10/10.0                      36  0234560001
 5467.5136.06d7      3045  Md1:10/10.0                       5  0234560001
 5467.5136.06d7      3044  Md1:10/10.0                      25  Harmonic
```

The following example displays the associations for all cable modems on a specific MAC address:



```
admin@CableOS> show cable l2-vpn dot1q-vc-map 5467.5136.06d7

 MAC ADDRESS     VLAN ID   MAC DOMAIN         SFID              Customer Name/VPN ID
 --------------  --------  -----------------  ----------------  --------------------
 5467.5136.06d7      3044  Md1:10/10.0                      25  Harmonic
 5467.5136.06d7      3045  Md1:10/10.0                       5  0234560001
```

The following example displays the associations for all cable modems on a specific IP address:



```
admin@CableOS> show cable l2-vpn dot1q-vc-map vpn 0234560001

 MAC ADDRESS     VLAN ID   MAC DOMAIN         SFID              Customer Name/VPN ID
 --------------  --------  -----------------  ----------------  --------------------
 5467.5136.9878      3045  Md1:10/10.0                      36  0234560001
 5467.5136.06d7      3045  Md1:10/10.0                       5  0234560001
```

Output columns

Field	Description
MAC ADDRESS	The MAC address of this CM
VLAN ID	The ID of the VLAN configured in the CRE
MAC DOMAIN	The MAC Domain for this CM

Field	Description
SFID	The Service Flow Identifier
Customer Name/VPN ID	The customer ID. The VPN ID is in hex

show cable l2-vpn mpls

Use the `show cable l2-vpn mpls` command to show information about VCID to VID hashing result per Service Flow for each CM which has L2VPN MPLS enabled its config file.

```
show cable l2-vpn mpls
```

Syntax description

This command has no arguments or keywords.

Default

This command has no default value.

Command mode

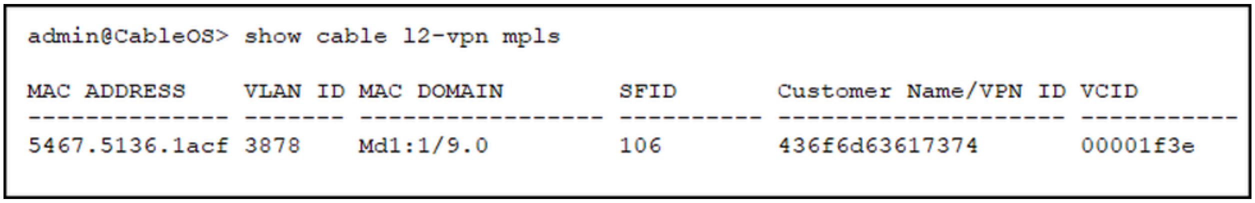
Exec mode

Usage guidelines

No additional usage guidelines.

Examples

The following example shows the information about VCID to VID hashing result per Service Flow for a CM which has L2VPN MPLS enabled in its config file.



```
admin@CableOS> show cable l2-vpn mpls

MAC ADDRESS    VLAN ID MAC DOMAIN        SFID       Customer Name/VPN ID VCID
-------------- ------- ----------------- ---------- -------------------- -----------
5467.5136.1acf 3878    Md1:1/9.0         106        436f6d63617374       00001f3e
```

Output columns

Field	Description
MAC ADDRESS	The MAC address of this CM
VLAN ID	The ID of the VLAN configured in the CRE
MAC DOMAIN	The MAC Domain for this CM
SFID	The Service Flow Identifier

Field	Description
Customer Name/VPN ID	The customer ID. The VPN ID is in hex
VCID	The VCID in hex

Related information

cable l2vpn mpls-to-vlan-mapping

show cable mac-domain

The `show cable mac-domain` command displays information about the MAC domains on the Core server.

`show cable mac-domain`

Syntax description

This command has no arguments or keywords.

Default

This command has no default value.

Command mode

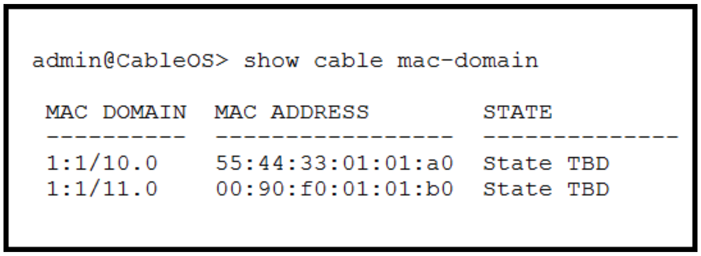
Exec mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The example below shows the output of a `show cable mac-domain` command:



```
admin@CableOS> show cable mac-domain

 MAC DOMAIN  MAC ADDRESS        STATE
 ----------  -----------------  --------------
 1:1/10.0    55:44:33:01:01:a0  State TBD
 1:1/11.0    00:90:f0:01:01:b0  State TBD
```

Output columns

Field	Description
MAC DOMAIN	The MAC domain name
MAC ADDRESS	The MAC address
STATE	The state

Related information

show cable mac-domain forwarding

show cable mac-domain forwarding

Use the `show cable mac-domain forwarding` command to display the interfaces and statistics belonging to MAC domains.

`show cable mac-domain forwarding [` *mdVC:VS/PP.0* `]`

Syntax description

mdVC:VS/PP.0	(Optional) Selects a single MAC domain. If omitted, selects all MAC domains.

Command mode

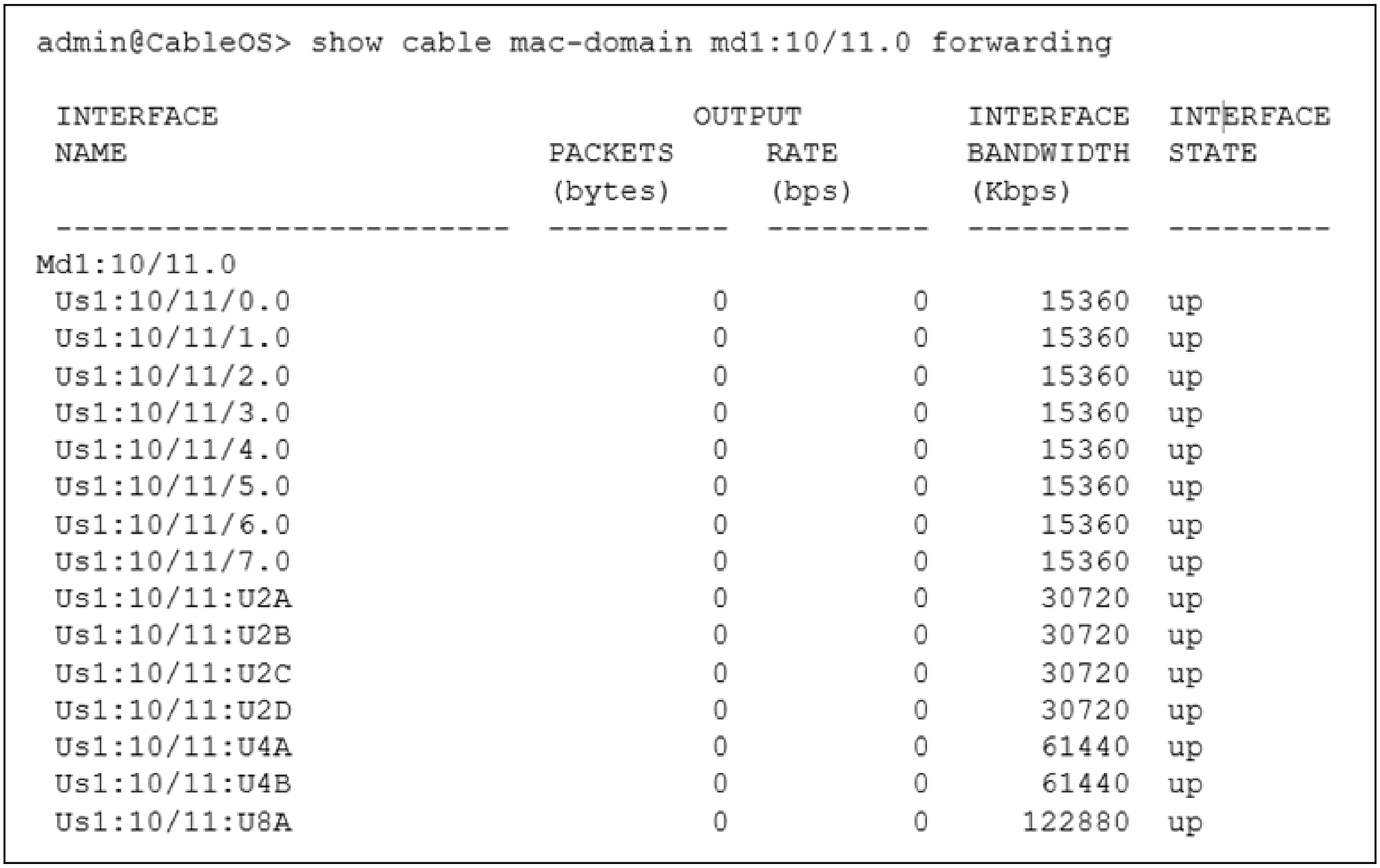
Exec mode.

Usage guidelines

The user can display statistics for all MAC domains, or for a selected MAC domain.

Example

The example below shows the output of a `show cable mac-domain forwarding` command with a specified MAC domain:



```
admin@CableOS> show cable mac-domain md1:10/11.0 forwarding

 INTERFACE                              OUTPUT          INTERFACE  INTERFACE
 NAME                          PACKETS       RATE       BANDWIDTH  STATE
                               (bytes)       (bps)      (Kbps)
 ------------------------- ---------- ---------- --------- ---------
Md1:10/11.0
 Us1:10/11/0.0                       0          0     15360  up
 Us1:10/11/1.0                       0          0     15360  up
 Us1:10/11/2.0                       0          0     15360  up
 Us1:10/11/3.0                       0          0     15360  up
 Us1:10/11/4.0                       0          0     15360  up
 Us1:10/11/5.0                       0          0     15360  up
 Us1:10/11/6.0                       0          0     15360  up
 Us1:10/11/7.0                       0          0     15360  up
 Us1:10/11:U2A                       0          0     30720  up
 Us1:10/11:U2B                       0          0     30720  up
 Us1:10/11:U2C                       0          0     30720  up
 Us1:10/11:U2D                       0          0     30720  up
 Us1:10/11:U4A                       0          0     61440  up
 Us1:10/11:U4B                       0          0     61440  up
 Us1:10/11:U8A                       0          0    122880  up
```

Field	Description
INTERFACE NAME	The name of the interface belonging to the MAC domain.
OUTPUT PACKETS/RATE	The cumulative packet output and the output rate.
INTERFACE BANDWIDTH	The total interface bandwidth allocated.
INTERFACE STATE	Whether the interface state is up or down.

Related information

show cable mac-domain

show cable mac-domain sid-pools

Use the show cable mac-domain sid-pools command to monitor SID pool utilization.

`show cable mac-domain` *mac-domain* `sid-pools`

Syntax description

mac-domain	A MAC domain name in the form *vc:vs/pp.d* where: • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/ upstream RF port of the MAC domain • *d* identifies a MAC domain on the rf-port, which for the current release must be 0

Default

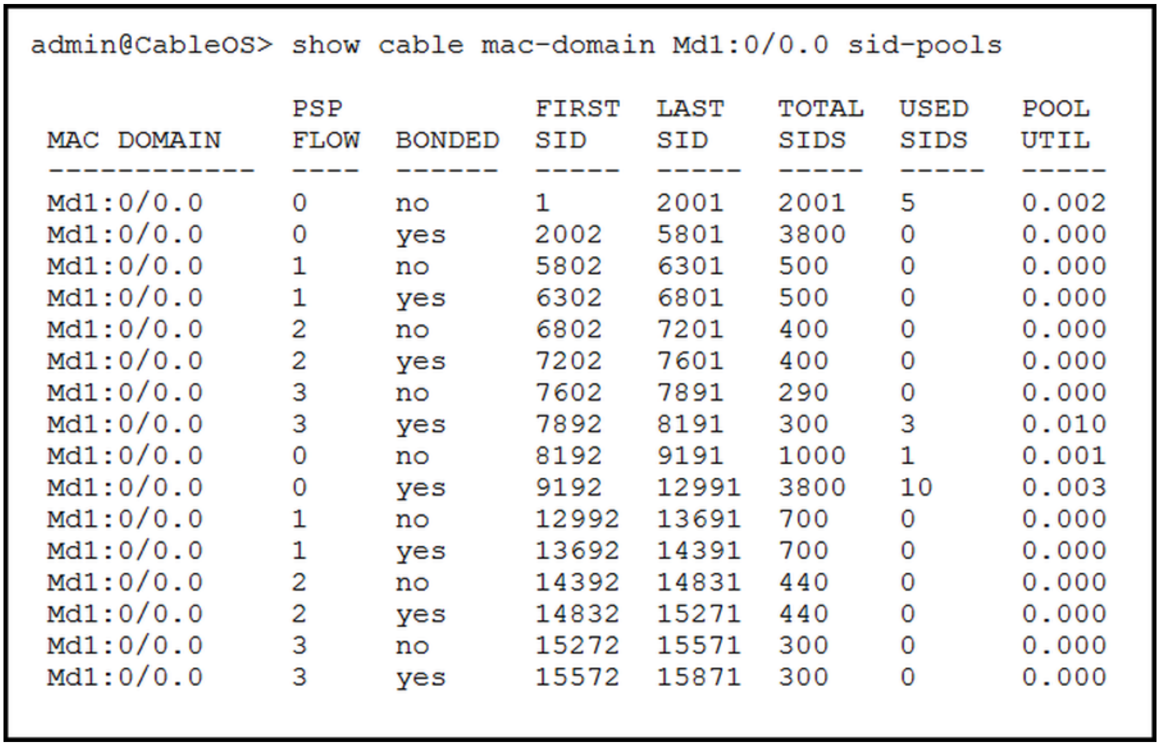
This command has no default value.

Command mode

Exec mode

Examples

The following example shows an example of the command output. The Pool Util (Utilization) is the result of this calculation: Used SIDS / Total SIDS.



```
admin@CableOS> show cable mac-domain Md1:0/0.0 sid-pools

                  PSP                 FIRST   LAST    TOTAL   USED    POOL
 MAC DOMAIN       FLOW    BONDED      SID     SID     SIDS    SIDS    UTIL
 ------------     ----    ------      -----   -----   -----   -----   -----
 Md1:0/0.0        0       no          1       2001    2001    5       0.002
 Md1:0/0.0        0       yes         2002    5801    3800    0       0.000
 Md1:0/0.0        1       no          5802    6301    500     0       0.000
 Md1:0/0.0        1       yes         6302    6801    500     0       0.000
 Md1:0/0.0        2       no          6802    7201    400     0       0.000
 Md1:0/0.0        2       yes         7202    7601    400     0       0.000
 Md1:0/0.0        3       no          7602    7891    290     0       0.000
 Md1:0/0.0        3       yes         7892    8191    300     3       0.010
 Md1:0/0.0        0       no          8192    9191    1000    1       0.001
 Md1:0/0.0        0       yes         9192    12991   3800    10      0.003
 Md1:0/0.0        1       no          12992   13691   700     0       0.000
 Md1:0/0.0        1       yes         13692   14391   700     0       0.000
 Md1:0/0.0        2       no          14392   14831   440     0       0.000
 Md1:0/0.0        2       yes         14832   15271   440     0       0.000
 Md1:0/0.0        3       no          15272   15571   300     0       0.000
 Md1:0/0.0        3       yes         15572   15871   300     0       0.000
```

Related information

cable mac-domain * sid-range

show cable map-advance

Use the `show cable map-advance` command to display the currently used map-advance settting on the MAC domain.

`show cable map-advance` [*mac-domain*]

Syntax description

mac-domain	(Optional) md vc:vs/pp.d. Specific MAC domain for which to provide the map advance setting.

Default

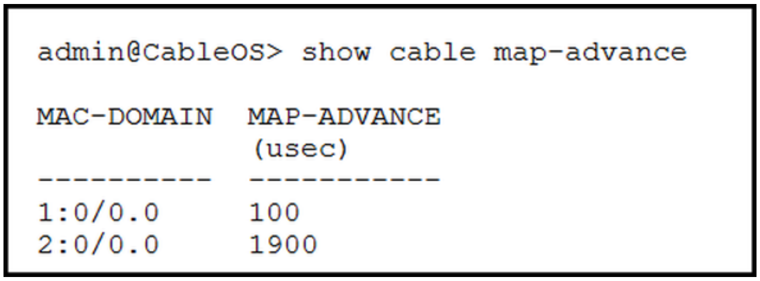
This command has no default value.

Command mode

Exec mode

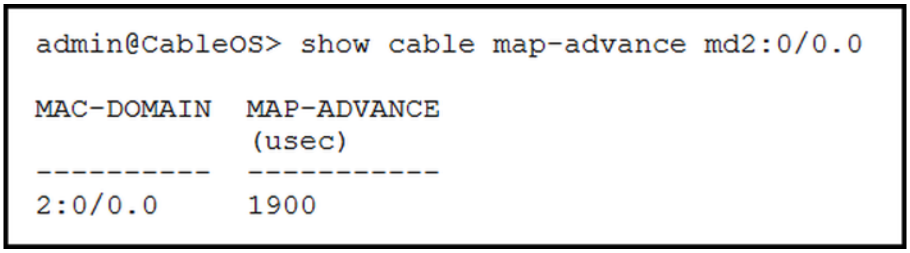
Examples

The following example shows the map advance setting for all MAC domains:



```
admin@CableOS> show cable map-advance

MAC-DOMAIN   MAP-ADVANCE
              (usec)
----------   -----------
1:0/0.0      100
2:0/0.0      1900
```

The following example shows the map advance setting for a specific MAC domain:



```
admin@CableOS> show cable map-advance md2:0/0.0

MAC-DOMAIN   MAP-ADVANCE
              (usec)
----------   -----------
2:0/0.0      1900
```

Related information

show cable latency history

show cable map-advance history

cable mac-domain * map-advance algorithm

cable mac-domain * map-advance

snmp-server enable traps core md-map-advance-changed

show cable map-advance history

Use the `show cable map-advance history` command to display the history of the used map-advance setttings on the MAC domain.

`show cable map-advance` *mac-domain* `history` [`max-length` *max-length*]

Syntax description

mac-domain	md vc:vs/pp.d. Specific MAC domain for which to provide the map advance setting history.
max-length	(Optional) The maximum number of entries to show on the output. The default value is 32.

Default

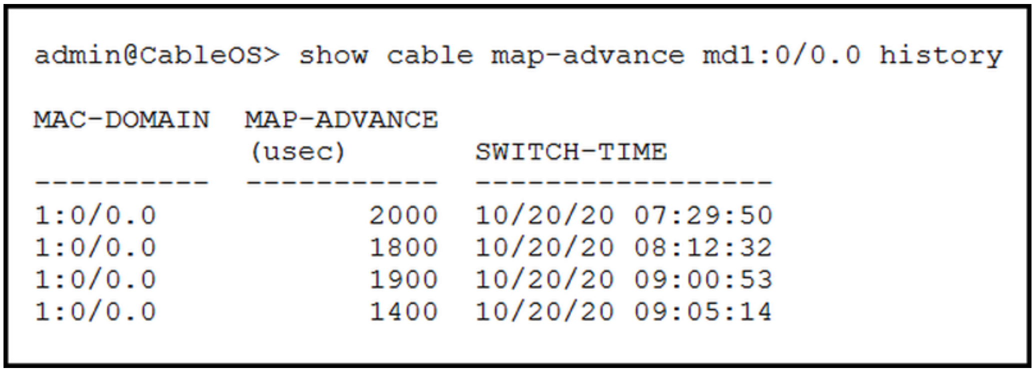
See the Syntax Description section for defaults.

Command mode

Exec mode

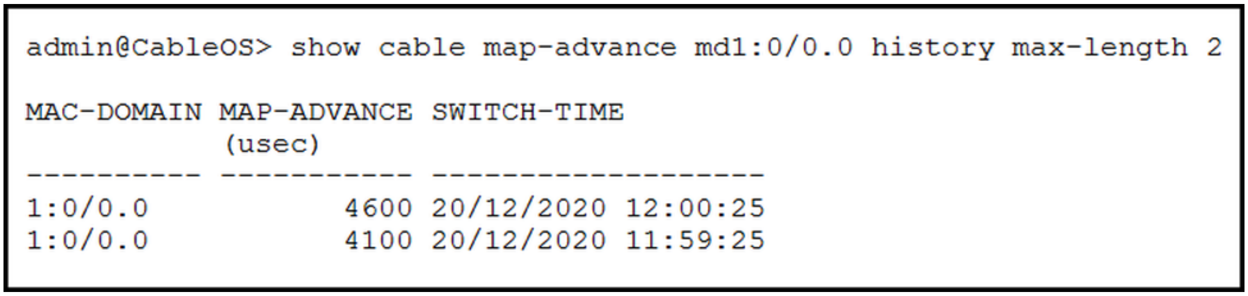
Examples

The following example shows the map advance setting history for a specific MAC domain:



```
admin@CableOS> show cable map-advance md1:0/0.0 history

MAC-DOMAIN   MAP-ADVANCE
              (usec)         SWITCH-TIME
----------   -----------    -----------------
1:0/0.0             2000    10/20/20 07:29:50
1:0/0.0             1800    10/20/20 08:12:32
1:0/0.0             1900    10/20/20 09:00:53
1:0/0.0             1400    10/20/20 09:05:14
```

The following example shows the last two entries of the map advance setting history for a specific MAC domain:



```
admin@CableOS> show cable map-advance md1:0/0.0 history max-length 2

MAC-DOMAIN MAP-ADVANCE SWITCH-TIME
            (usec)
---------- ----------- -------------------
1:0/0.0           4600 20/12/2020 12:00:25
1:0/0.0           4100 20/12/2020 11:59:25
```

Related information

show cable latency history

show cable map-advance

cable mac-domain * map-advance algorithm

cable mac-domain * map-advance

snmp-server enable traps core md-map-advance-changed

show cable modem

Use the `show cable modem` command to show the state information associated with an individual CM.

`show cable modem` { *single-cm* }

To show state information for multiple CMs, enter the following command:

`show cable modem` [*cable-interfaces*] [*multiple-cm*] [`total`] [`virtual`]

Syntax description

single-cm	Selects a CM.

cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
[multiple-cm]	Selects a subset of the CMs operating on cable-interfaces.
`total`	With the "total" argument in the command line, the CableOS Core omits the column headers and displays only the "Command Total" line.
`virtual`	If the VSC (virtual split combining) feature is configured, this keyword forces a report of the virtual streams related to the CM rather than the physical streams.

Command mode

Exec mode.

Usage guidelines

The command `show cable modem` with no other arguments shows default option columns for all CMs on the chassis.

When *cable-interfaces* contains a wild-card expansion for multiple interfaces, the CableOS Core displays CMs grouped by each interface. The CableOS Core displays the interface ifName starting in column 1 before displaying the CMs within that group. A "Subtotal" line after each group reports the number of modems in the group. The CableOS Core reports a subtotal of 0 modems for an interface that is administratively up but has no CMs operating on it.

At the end of the command, the CableOS Core displays a "Command Total" line with the total number of CMs reported for the command.

You can use the `show cable modem total` command with the following cable interfaces. The number of modems in the group is displayed.

<dsVC:VS/PP/C>	Selects CMs belonging to 'cable ds-rf-port VC:VS/PP down-channel C’.
<dsVC:VS/PP:B>	Selects CMs belonging to 'cable mac-domain VC:VS/PP.0 ds-bonding group B'.
<dsVC:VS/PP>	Selects CMs belonging to ‘cable ds-rf-port VC:VS/PP’.
<mdVC:VS/PP.0>	Selects CMs belonging to 'cable mac-domain VC:VS/PP.0’.
<usVC:VS/PP:B>	Selects CMs belonging to 'cable mac-domain VC:VS/PP.0 us-bonding group B'.

<usVC:VS/PP>	Selects CMs belonging to ‘cable us-rf-port VC:VS/PP’.
<usVC:VS/PP/C.L>	Selects CMs belonging to 'cable us-rf-port VC:VS/PP us-phy-channel C us-logical-channel L'.
<usVC:VS/PP/C>	Selects CMs belonging to 'cable us-rf-port VC:VS/PP us-phy-channel C’.
<oaVC:VS/PP/C>	Selects CMs belonging to 'cable us-rf-port VC:VS/PP ofdma-channel C'.
<ofVC:VS/PP/C>	Selects CMs belongs to 'cable ds-rf-port VC:VS/PP ofdm-channel C'.

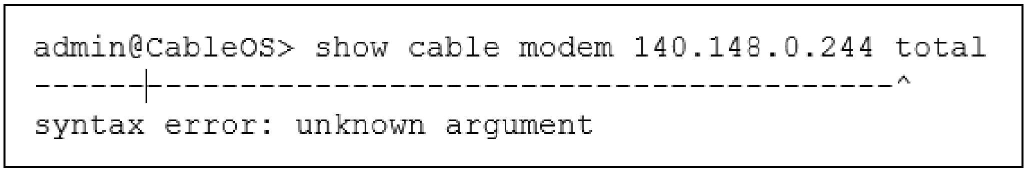
For the basic **show cable modem** [**all**] variation, the CableOS Core displays one line for each CM operating on the cable-interfaces. For mac-domains, ds-rf-ports, and us-rf-port interfaces, the command displays a single line for each CM. When expanding wild-carded down-channel interfaces (for example, "dsnn:ss/pp/*"), the CableOS Core repeats the display for each downstream bonding CM configured to receive that down-channel in its Receive Channel Configuration (RCC), and includes the CM in the "Subtotal" count for each received down-channel. The downstream bonding CM is counted only once however, in the overall "Command Total". Similarly, when expanding wild-carded us-phy-channel ("usnn:ss/pp/*") or us-logical-channel ("usnn:ss/pp/C.*") interfaces, an upstream bonding CM is displayed and counted in the "Subtotal" for each interface of its Transmit Channel Set, but is counted only once in the "Command Total".

The command displays the selected modems in the following sort order:

- By MAC domain
- By "Downstream Chan Set" unless md-or-port is specified as usnn:ss/pp, in which case it is sorted by "Upstream Chan Set"
- By MAC address within the channel set selected above

NOTE: If the Virtual Splitting Combining feature is configured, the command will return physical up/down streams. The command will return a `not found` message for physical ports that are part of a virtual port.

The `show cable modem total` command cannot include an IP, such as show cable modem <ddd.ddd.ddd.ddd> total.



```
admin@CableOS> show cable modem 140.148.0.244 total
----------------------------------------------^
syntax error: unknown argument
```

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

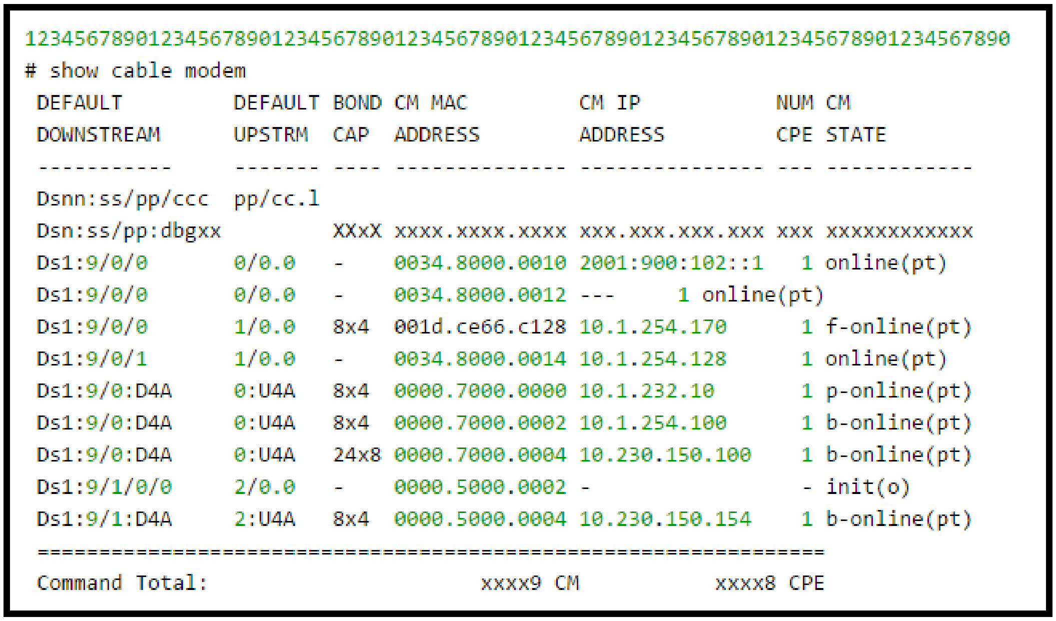
```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example shows the results of the `show cable modem` command with no arguments. The CableOS Core shows a single "Command Total" at the end that shows the number of CMs and CPEs known by the CableOS Core.

NOTE:

The IP Address field shows "---" because the IPv6 address is too long for the size of the output field. To view a complete IPv6 address for a device, use the verbose form of the command with the CM’s MAC address, or `show cable modem IPv6`..

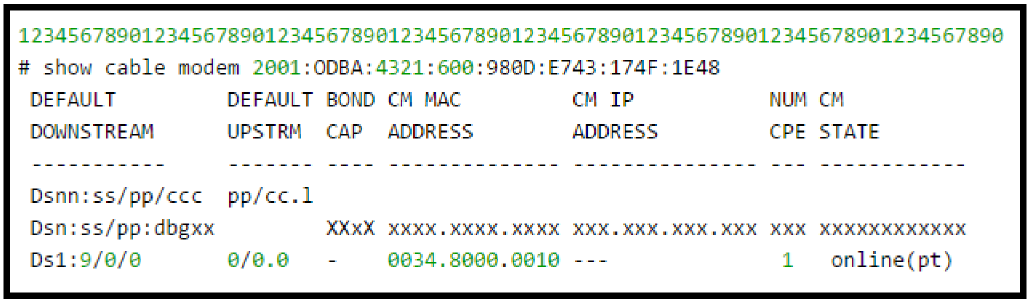


```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
# show cable modem
 DEFAULT         DEFAULT BOND CM MAC         CM IP           NUM CM
 DOWNSTREAM      UPSTRM  CAP  ADDRESS        ADDRESS         CPE STATE
 -----------     ------- ---- -------------- --------------- --- ------------
 Dsnn:ss/pp/ccc  pp/cc.l
 Dsn:ss/pp:dbgxx         XXxX xxxx.xxxx.xxxx xxx.xxx.xxx.xxx xxx xxxxxxxxxxxx
 Ds1:9/0/0       0/0.0   -    0034.8000.0010 2001:900:102::1   1 online(pt)
 Ds1:9/0/0       0/0.0   -    0034.8000.0012 ---      1 online(pt)
 Ds1:9/0/0       1/0.0   8x4  001d.ce66.c128 10.1.254.170      1 f-online(pt)
 Ds1:9/0/1       1/0.0   -    0034.8000.0014 10.1.254.128      1 online(pt)
 Ds1:9/0:D4A     0:U4A   8x4  0000.7000.0000 10.1.232.10       1 p-online(pt)
 Ds1:9/0:D4A     0:U4A   8x4  0000.7000.0002 10.1.254.100      1 b-online(pt)
 Ds1:9/0:D4A     0:U4A   24x8 0000.7000.0004 10.230.150.100    1 b-online(pt)
 Ds1:9/1/0/0     2/0.0   -    0000.5000.0002 -                 - init(o)
 Ds1:9/1:D4A     2:U4A   8x4  0000.5000.0004 10.230.150.154    1 b-online(pt)
 ================================================================
 Command Total:                      xxxx9 CM          xxxx8 CPE
```

The following example shows the results of the `show cable modem` command with the IPv6 address of 001:ODBA:4321:600:980D:E743:174F:1E48:

NOTE:

The IP Address field shows "---" because the IPv6 address is too long for the size of the output field. To view a complete IPv6 address for a device, use the verbose form of the command.



```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
# show cable modem 2001:ODBA:4321:600:980D:E743:174F:1E48
 DEFAULT         DEFAULT BOND CM MAC         CM IP           NUM CM
 DOWNSTREAM      UPSTRM  CAP  ADDRESS        ADDRESS         CPE STATE
 -----------     ------- ---- -------------- --------------- --- ------------
 Dsnn:ss/pp/ccc  pp/cc.l
 Dsn:ss/pp:dbgxx         XXxX xxxx.xxxx.xxxx xxx.xxx.xxx.xxx xxx xxxxxxxxxxxx
 Ds1:9/0/0       0/0.0   -    0034.8000.0010 ---              1   online(pt)
```

The following example will show wild-card subtotals for a set of MAC domains. In this case, the subtotal of CM and CPE counts are displayed for each MAC domain.

```
show cable modem md*/*
```

The following example uses the "total" keyword to display only the subtotals for wild-cards and the command total counts of CMs and CPEs.

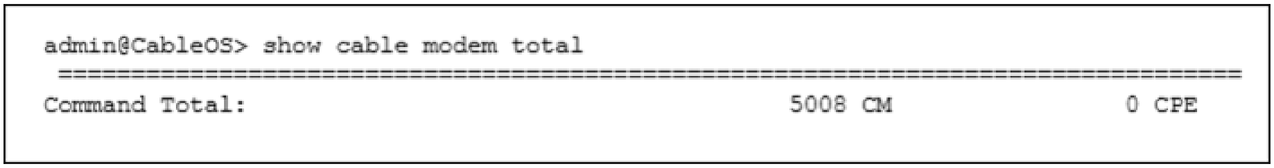
```
show cable modem md*/* total
```

The following example will show wild-card expansion of downstream ports. The CableOS Core displays subtotals for each administratively enabled Downstream Channel Set on a port, whether or not multiple ds-rf-ports are selected with a wild-card.

```
show cable modem ds*/*
```

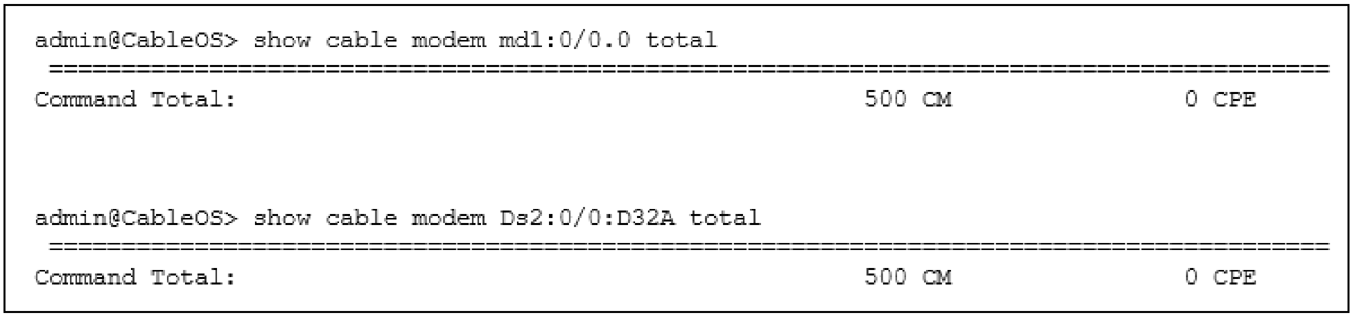
The following example uses the "total" argument in the command line. The COS CORE omits the column headers and displays only the "Command Total" line:

```
show cable modem total
```



```
admin@CableOS> show cable modem total
 =================================================================================
Command Total:                                     5008 CM                0 CPE
```

The following examples use the "total" argument with cable-interfaces:



```
admin@CableOS> show cable modem md1:0/0.0 total
 ========================================================================================
Command Total:                                           500 CM                0 CPE


admin@CableOS> show cable modem Ds2:0/0:D32A total
 ========================================================================================
Command Total:                                           500 CM                0 CPE
```

The table below explains the meaning of the different CM states that can be displayed:

CM State	Description
offline	The CMTS considers the CM as offline (disconnected or powered down).
init(r1)	The CMTS received initial ranging from the CM.
init(r2)	The CMTS received initial ranging from the CM and has sent RF power, timing offset, and frequency adjustments to the CM.
init(rc)	The CMTS has sent a ranging success to the CM.
init(d)	The CMTS has received an IPv4 DHCPDISCOVER from the CM.
init(io)	The CMTS has forwarded an IPv4 DHCPOFFER to the CM.
init(a)	The CMTS has forwarded a downstream IPv4 DHCP-ACK to an initializing CM.
init(pk)	The CMTS has completed registration for CM enabled for BPI and is in the process of "privacy keying" after receiving an AUTH-INFO or AUTH-REQ. The CMTS does not forward NSI traffic in this state.
init6(s)	The CMTS has forwarded an upstream DHCPv6 SOLICIT from an initializing CM.
init6(a)	The CMTS has forwarded a downstream DHCPv6 ADVERTISE message to an initializing CM.
init6(r)	The CMTS has forwarded an upstream DHCPv6 REQUEST message from an initializing CM.
init6(i)	The CMTS has forwarded a downstream DHCPv6 REPLY message to an initializing CM.
online	The CMTS has registered a non-bonding-capable CM (that is, DOCSIS 2.0) and is forwarding subscriber data in 1x1 mode without BPI privacy.
online(pt)	The CMTS has registered a non-bonding-capable CM (that is, DOCSIS 2.0) and is forwarding subscriber data in 1x1 mode with BPI as "private traffic".
b-online	The CMTS has registered a bonding-capable CM normally and is forwarding subscriber data on multiple "bonded" channels without BPI privacy.
b-online(pt)	The CMTS has registered a bonding-capable CM normally and is forwarding subscriber data with BPI as "private traffic".

CM State	Description
f-online	The CMTS has registered a bonding-capable CM in DOCSIS 2.0 1x1 channel mode because it "failed" to register in DOCSIS 3.0 mode. The CMTS is forwarding subscriber data without BPI privacy. (See Note 1 below)
f-online(pt)	The CMTS has registered a bonding-capable CM in DOCSIS2.0 1x1 channel mode because it "failed" to register in DOCSIS 3.0 mode. The CMTS is forwarding subscriber data with BPI as "private traffic". (See Note 1 below)
p-online	The CMTS has registered a bonding-capable CM in "partial" mode with fewer than its capable bonding channels, and is forwarding subscriber data without BPI privacy. (See Note 2 below)
p-online(pt)	The CMTS has registered a bonding-capable CM in "partial" mode with fewer than its capable bonding channels, and is forwarding subscriber data with BPI as "private traffic". (See Note 2 below)
reject(m)	The CMTS has rejected CM registration due to an invalid MIC verification caused by a differing shared secret.
reject(pk)	The CMTS has rejected CM KEK key assignment due to BPI certification failure. Forwarding is disabled and the CM must be operationally reset to re-attempt initialization.

NOTE:

Note 1: These states indicate that an initializing CM mistakenly considered the CMTS to support only DOCSIS 2.0 because it failed to observe a valid DOCSIS 3.0 Mac Domain Descriptor (MDD) message. It is necessary to reset the CM to force it to re-initialize properly into bonding mode. The CMTS considers a CM to be bonding-capable when its IPv4/IPv6 DHCP vendor class id option includes the sub-string "docsis3", or its registration capabilities indicate support for more than one downstream channel. The CMTS considers a CM to fail to register in DOCSIS 3.0 mode when it submits a legacy REG-REQ registration request rather than the multi-part REG-REQ-MP message introduced with DOCSIS 3.0.

Note 2: In the `show cable modem` command, the "BOND ACT" column shows the actual number of channels the CMTS is bonding for the CM, and the "BOND CAP" column shows the CM's maximum capacity for number of bonded channels. Run the `show cable modem partial-mode` command to report the particular channel impairment.

Output columns

Field	Description
Default Downstream	The cable modem downstream bonding group
Default Upstream	The cable modem upstream bonding group
Bond Cap	The CM's maximum capacity for number of bonded channels
OFDM CAP	OFDM capability advertised by the CM when it was last registered

Field	Description
CM Mac Address	The MAC address of the CM
CM IP Address	The IP address of the CM
NUM CPE	The number of CPEs
CM State	The various possible CM states such as Offline or b-online are described above
Command Total	The number of CMs and CPEs known by the CableOS Core

Related information

show cable modem bonding
show cable modem cm-status
show cable modem connectivity
show cable modem counters
show cable modem cpe
show cable modem ipv6
show cable modem primary-channel
show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem bonding

To display information relevant to a single bonding CM, enter the following command in Exec mode:

```
show cable modem { single-cm } bonding
```

To display information relevant to multiple bonding-capable CMs, enter the following command in Exec mode:

```
show cable modem [ { cable-interfaces ]  | bonding [  | downstream   | upstream ] [  |
total } ]
```

Syntax description

single-cm	Selects a CM.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.

[select *multiple-cm*]	(Optional) Selects a subset of the CMs operating on the cable-interfaces.
`{total}`	With the “total” argument in the command line, the CableOS Core omits the column headers and displays only the “Subtot” and “Command Total” lines.

Command mode

Exec mode.

Usage guidelines

A bonding CM is one registered to receive multiple downstream channels or to transmit on multiple upstream transmit channels on any service flow.

The command shows information for all CMs that indicated in their registration request that they were capable of either downstream or upstream bonding.

Examples

The following example shows the command for a CM:

```
show cable modem bonding
```

```
admin@CableOS> scm 287a.ee62.8557 bonding

 MAC           CM MAC             BOND  BOND  OFDM  OFDM  CM            DS
       US
 DOMAIN        ADDRESS            CAP   ACT   CAP   ACT   STATE         RCS
       RCS
 ------------  -----------------  ----  ----  ----  ----  ------------
 -----------------  -----------------
 Md3:0/15.0    287a.ee62.8557     8x4   8x4   -     -     b-online(pt)
 Ds3:0/15:Dyn1      Us3:0/15:DYN-U4H
```

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Output columns

Field	Description
MAC DOMAIN	The MAC domain for the cable modem
CM MAC ADDRESS	The Ethernet MAC address of the cable modem
BOND CAP	Bonding capability advertised by the CM when it was last registered, as DDxU for DD as the “Multiple Receive Channels” capability TLV 5.29 and U as the “Multiple Transmit Channels” capability (TLV 5.24). If the CM is not registered, a single hyphen “-“ is displayed.
BOND ACT	Actual number of channels used by the default downstream service flow and default upstream service flow of the CM. If the CM is not registered, a single hyphen “-“ is displayed.
OFDM CAP	OFDM capability advertised by the CM when it was last registered, as MxN where M is the CM's OFDM Multiple Receive Channel capability and N is the CM's OFDMA Multiple Transmit Channel capability. pre-3.1 CMs report as "-".
OFDM ACT	The actual number of downstream OFDM and upstream OFDMA channels used by the CM. "-" if none
CM STATE	The state of the CM on its MAC domain
DS RCS	The name of the ds-bonding-group corresponding to the CM's Receive Channel Set (RCS)
US RCS	The name of the us-bonding-group corresponding to the CM's Transmit Channel Set (TCS)

Related information

show cable modem
show cable modem connectivity
show cable modem counters
show cable modem cpe
show cable modem ipv6
show cable modem primary-channel
show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem calls

Use the following command to view voice call information for a particular CM.

`show cable modem` [{ *ip-address mac-address* | `cable` | { *slot* / *subslot* / *port* } | { *slot* / *cable-interface-index* } | `upstream port` }] `calls`

Syntax description

ip-address	(Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.
mac-address	(Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.
slot	The valid range is from 5 to 8.
subslot	The valid subslots are 0 or 1.
port	The valid range is from 0 to 4 (depending on the cable interface).
cable-interface-index	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
`upstream port`	(Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for a port begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card.
`logical-channel-index`	(Optional) Logical channel index. The valid values are 0 or 1.
`calls`	Displays voice call information for a CM.

Command mode

Exec mode.

Usage guidelines

Using the keyword options, you can display IPv6 information by IP address (IPv4 or IPv6) of a particular CM, for all CMs associated with a specified cable interface, by MAC address of a CM, or by domain name of a CM. All filters are optional, only 1 filter can be applied.

The command is used to view active phone calls or active 911 calls. For example, if a cable operator wants to avoid any action that will result in CMs going off-line, and if there are active 911 calls, or if there are a lot of normal voice calls. This command is also used for VoIP troubleshooting.

This command displays information about PacketCable 1.5 and PCMM calls, however DQoS-lite calls are not included.

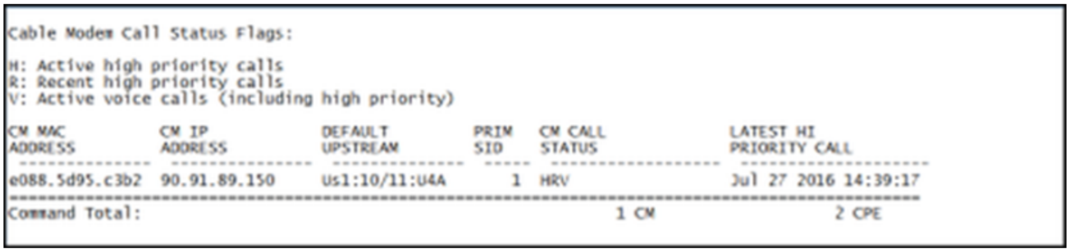
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 -----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 -----------------------------------------------------------------------------
 x
```

Example

The following example shows the output for the default calls option for a particular CM:

```
show cable modem 90.91.89.150 callsNotes:
```



```
Cable Modem Call Status Flags:

H: Active high priority calls
R: Recent high priority calls
V: Active voice calls (including high priority)

CM MAC          CM IP           DEFAULT          PRIM  CM CALL                LATEST HI
ADDRESS         ADDRESS         UPSTREAM         SID   STATUS                 PRIORITY CALL
 -------------- --------------- --------------- ----- ---------------------- ----------------------
e088.5d95.c3b2  90.91.89.150    Us1:10/11:U4A       1  HRV                    Jul 27 2016 14:39:17
==================================================================================================
Command Total:                                       1 CM                              2 CPE
```

Output Columns

CM MAC ADDRESS	The MAC address of the CM
CM IP ADDRESS	The IP address of the CM
PRIM SID	A primary SID (a SID on which a CM does periodic ranging)
CM CALL STATUS	The voice call status of the CM. "H" stands for an active 911 call, "R" stands for a 911 call on this CM after the last CMTS reboot, "V" stands for an active call.
LATEST HI PRIORITY CALL	Date and Time

show cable modem classifiers

To display information about the classifiers for a particular CM, use the `show cable modem classifiers` command.

```
show cable modem{ip-address  | mac-address}classifiers
```

Syntax description

`ip-address`	(optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, the information for that CM is displayed.
`mac-address`	(optional) MAC address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, the information for that CM is displayed.

Command mode

Exec mode.

Usage guidelines

This command displays classifier information for a particular CM, identified either by its IP address or MAC address.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example will display all information about the classifiers for the CM at the given MAC address:

```
show cable modem 001d.d68f.cb3d classifiers
```

Output columns

Field	Description
CfrID	Classifier ID for the classifier that is being displayed
SFID	Service flow ID for this classifier
CM MAC Address	MAC address for the CM
Direction	Identifies whether this classifier applies to the downstream or upstream
State	Classifier activation state: active or inactive
Priority	Classifier rule priority for this classifier

Related information

show cable modem

show cable modem bonding
show cable modem connectivity
show cable modem counters
show cable modem cpe
show cable modem ipv6
show cable modem primary-channel
show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem cm-status

To display a summary of the CM-STATUS messages received by the Core, use the `show cable modem cm-status` command.

`show cable modem` [*single-cm* | *cable-interfaces*] `cm-status` [`event-code` *event-code* | `event-condition` *event-condition*] [`profile-id` *profile-id*] [`total`] [`order-by-time-descending` | `order-by-time-ascending`]

Syntax description

single-cm	(Optional) Selects a CM, as specified in the *Cable modem selection* section.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
event-code	(Optional) Selects CM-STATUS events by the integer event code
event-condition	(Optional) Selects CM-STATUS events by the event condition
profile-id	(Optional) Selects CM-STATUS events with the given OFDM/OFDMA profile ID (integer or 'none')
`total`	(Optional) Displays counters aggregated by CM-STATUS events.
`order-by-time-ascending|order-by-time-descending`	(Optional) Orders the command output by time.`order-by-time-ascending` shows the earliest events first. `order-by-time-descending` shows the most recent events first.

Command mode

Exec mode.

Usage guidelines

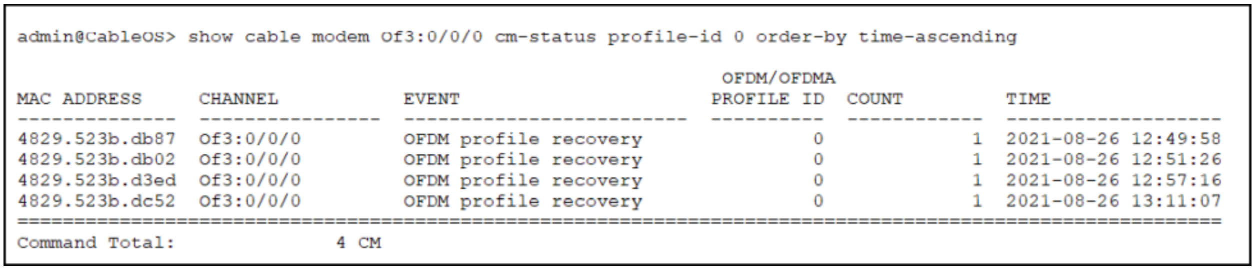
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example will display all CM-Status information for all CMs on the chassis for OFDM/OFDMA profile 0 and sorted in time ascending order:

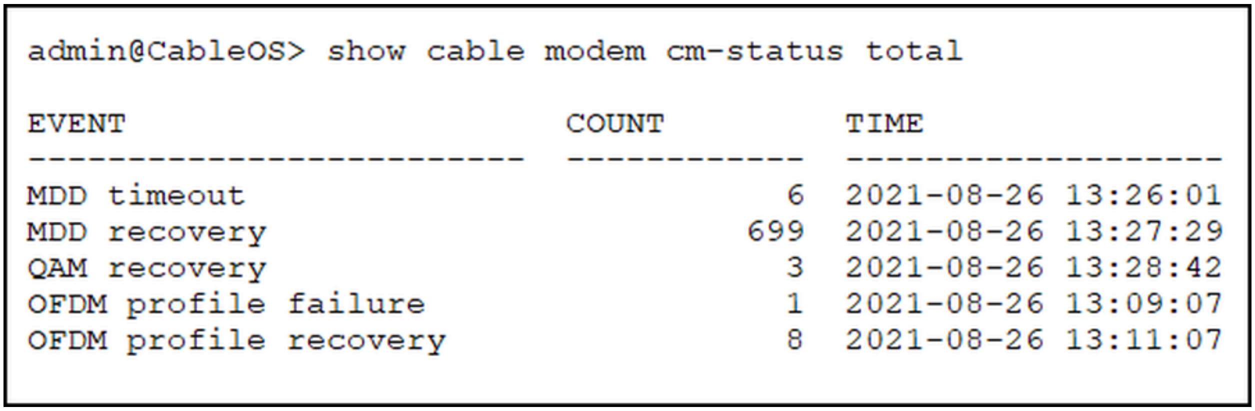
```
show cable modem cm-status
```



```
admin@CableOS> show cable modem Of3:0/0/0 cm-status profile-id 0 order-by time-ascending

                                                              OFDM/OFDMA
MAC ADDRESS     CHANNEL           EVENT                      PROFILE ID  COUNT         TIME
--------------  ----------------  -------------------------  ----------  ------------  -------------------
4829.523b.db87  Of3:0/0/0         OFDM profile recovery               0             1  2021-08-26 12:49:58
4829.523b.db02  Of3:0/0/0         OFDM profile recovery               0             1  2021-08-26 12:51:26
4829.523b.d3ed  Of3:0/0/0         OFDM profile recovery               0             1  2021-08-26 12:57:16
4829.523b.dc52  Of3:0/0/0         OFDM profile recovery               0             1  2021-08-26 13:11:07
==========================================================================================================
Command Total:              4 CM
```

The following example will display aggregate CM-Status information for all CMs on the chassis:

```
show cable modem cm-status total
```



```
admin@CableOS> show cable modem cm-status total

EVENT                      COUNT         TIME
-------------------------  ------------  -------------------
MDD timeout                           6  2021-08-26 13:26:01
MDD recovery                        699  2021-08-26 13:27:29
QAM recovery                          3  2021-08-26 13:28:42
OFDM profile failure                  1  2021-08-26 13:09:07
OFDM profile recovery                 8  2021-08-26 13:11:07
```

Output columns

Field	Description
MAC ADDRESS	The Ethernet MAC address of the cable modem that generated CM-STATUS messages
CHANNEL	The channel associated with CM-STATUS messages
EVENT	The name of the CM-STATUS event associated with the CHANNEL
COUNT	The number of occurrences of the EVENT
OFDM/OFDMA PROFILE ID	the OFDM/OFDMA profile ID with which the event occurred
TIME	The last time a particular EVENT was observed

Related information

clear cm-status

show cable modem

show cable modem connectivity

To display connectivity statistics for one or more CMs, use the `show cable modem connectivity` command.

```
show cable modem [{ip-address  | mac-address  | cable |{slot/port} |{slot/
cable-interfaces-index}}] connectivity
```

Syntax description

`ip-address`	(optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, the information for that CM is displayed.
`mac-address`	(optional) MAC address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, the information for that CM is displayed.
`cable-interfaces`	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.

Command mode

Exec mode.

Usage guidelines

This command displays connectivity information for all cable modems, for all cable modems attached to a specific CMTS cable interface, or for a particular CM, as identified by its IP address or MAC address.

Output columns

Field	Description
Prim SID	The primary SID assigned to this CM
1st time online	The first time that the modem with this SID connected
Times online	The number of times that the modem with this SID connected
% online	The percentage of time that the modem with this SID has been connected
Online time	The minimum, average, and maximum number of days, hours, and minutes that the modem with this SID has been connected
Offline time	The minimum, average, and maximum number of days, hours, and minutes that the modem with this SID has been disconnected

Examples

The following example will display all connectivity information about the CM:

```
show cable modem connectivity
```

Related information

show cable modem
show cable modem bonding
show cable modem counters
show cable modem cpe
show cable modem ipv6
show cable modem primary-channel
show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem counters

Use the `show cable modem counters` command to display the counters for traffic received and transmitted to a single cable modem:

`show cable modem` { *single-cm* } `counters`

Use the `show cable modem counters total` command to display the counters for traffic received and transmitted to multiple modems:

`show cable modem` [*cable-interfaces*] `counters` [`total`]

Syntax description

single-cm	Selects a CM.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
`total`	With the *total* argument in the command line, the CableOS Core omits the column headers and displays only the "Subtotal" and "Command Total" lines.

Command mode

Exec mode.

Usage guidelines

You can select to show counters for a specific CM or for all CMs.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ----------------------------------------------------------------------------
 x
```

Examples

The following example shows the counters for a single modem at MAC address 0000.7000.000:

```
show cable modem 0000.7000.000 counters
```

The following example shows the counters for all modems. The output is sorted first by MAC domain and secondly by CM MAC address:

```
show cable modem counters
```

The following example shows the counters for all modems in all MAC domains. The output is sorted first by MAC domain and secondly by CM MAC address:

```
show cable modem counters md */*
```

Related information

show cable modem
show cable modem bonding
show cable modem connectivity
show cable modem cpe
show cable modem ipv6
show cable modem primary-channel
show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem cpe

To show a summary of the CPE MAC addresses known by the CableOS Core, use the `show cable modem cpe` command.

```
show cable modem cpe [ { single-cm  | cable-interfaces ] [  | ipv6 } ]
```

Syntax description

single-cm	Selects a CM.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
ipv6	Displays the CPE devices for the CM with the specified IPv6 address.

Command mode

Exec mode.

Usage guidelines

The command displays one line per known combination of CPE MAC address and CPE IP address. Note that in general the CableOS Core supports multiple IP addresses per CPE MAC address. Each line contains the MAC address of the CM through which that CPE MAC address is reached, along with a CPE IP address. In some cases, the CableOS Core knows a CPE MAC address without an IP address or an IP address without a MAC address.

The CableOS Core displays the CPE MAC addresses grouped by MAC domain and the cable modem ordered by MAC address of the cable modem.

The CableOS Core learns of CPE hosts by one of the following methods:

- Snooping IPv4 DHCP, associating both CPE IPv4 address and CPE MAC address
- Snooping IPv6 DHCP, associating both CPE IPv6 address and CPE MAC address
- CM configuration file “SAV Authorization Encoding” (TLV 43.7), which either indirectly with an SAV Group Encoding (TLV 43.7.1) or directly with an SAV Static Prefix Encoding (TLV 43.7.2) identifies a set of authorized IP subnets for CPEs

When a CM configuration file contains an SAV Authorization Encoding (TLV 43.7), the CableOS Core learns unique CPE MAC addresses with a source IP address within an IP subnet identified by the encoding.

NOTE:

The CableOS Core does not currently support CM configuration file TLVs 14, 36, and 61. In a future release, the CableOS Core will support these TLVs as follows:
When a CM configuration file contains “CPE Ethernet MAC Address” (TLV 14), the CableOS Core will accept all upstream traffic from the configured source MAC address and learn no IP address with that MAC address;
When a CM configuration file contains a “Subscriber Management CPE IPv4 List” (TLV 36) encoding, the CableOS Core will associate source CPE MAC addresses with source IP addresses within the IPv4 subnets identified in the encoding.
When a CM configuration file contains a “Subscriber Management CPE IPv6 List” (TLV 61) encoding, the CableOS Core will associate source CPE MAC addresses with source IP addresses within the IPv6 subnets identified in the encoding.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ----------------------------------------------------------------------------
 x
```

Examples

The following example will display summary information about the CPE address:

```
show cable modem cpe
```

Output columns

Field	Description
CM MAC Address	The Ethernet MAC address of the cable modem through which a CPE MAC address was learned.

Field	Description
	On each output line, the CM MAC address is separated from the rest of the line by a colon “:” to distinguish it from the CPE MAC address when filtering the command output. It is important for the colon to have a space before and after it so that double-clicking can select either the CM MAC address or the CPE IP address without including the colon.
Host	The host type of the CPE as one of the following: • **eMTA** indicates an Embedded Media Transport Agent, detected by snooping the DHCP Vendor Class Identifier option (DHCPv4 option 60 or DHCPv6 option 16). • **CPE** indicates all other CPE host types. This includes both external CPEs and other embedded host types other than the ones mentioned above.
CPE MAC address	The Ethernet MAC address learned for a CPE host reached through the CM identified on the output line
State	Indicates the state of CPE mac/IP learning • d4(d) when the last event for a CPE MAC address with no (mac, IPv4) combinations was an upstream DHCPv4 DISCOVER message, for which the CPE IP address is unknown and displayed as “-“ • d4(o) when the last event for (mac,IPv4) combination was a downstream DHCPv4 OFFER message • d4(r) when the last event for a (mac,IPv4) combination was an upstream DHCPv4 REQUEST message • d4 when the last event for a (mac,IPv4) combination was a downstream DHCP-ACK message • d6(s) when last event for a CPE MAC address with no (mac, IPv6) combinations was an upstream DHCPv6 SOLICIT message • d6(a) when the last event for a (mac,IPv6) combination was a downstream DHCPv6 ADVERTISE message • d6(r) when the last event for a (mac,IPv6) combination was an upstream DHCPv6 REQUEST message • d6 when the last event for a (mac,IPv6) combination was a downstream DHCPv6 REPLY message • sav4 when the last event for a (mac,IPv4) combination was an upstream IPv4 packet with a source IP address that was IPv6 within an authorized Source Address Validation (SAV) IPv4 subnet • sav6 when the last event for a (mac,IPv6) combination was an upstream IPv4 packet with a source IP address that was within an authorized Source Address Validation (SAV) IPv6 subnet • sta(i) when a CM “initially” registers with a static CPE MAC address from the CM configuration file TLV 14, but no upstream IP packet from that CPE MAC has yet been seen, and for which the CPE IP address is unknown and shown as “-“;IPv6 • st4 for a (mac, IPv4) combination learned when an upstream packet with an IPv4 source IP address is from a statically configured CPE MAC address from CM configuration file TLV 14

Field	Description
	• st6 for a (mac, IPv4) combination learned when an upstream packet with an IPv4 source IP address is from a statically configured CPE MAC address from CM configuration file TLV 14 • sm4 when the last event for a (mac, IPv4) combination was an upstream IPv4 packet snooped with a source IP address within an IPv4 subnet configured with the CM configuration file encoding Subscriber Management CPE IPv4 List (TLV 36) • sm4 when the last event for a (mac, IPv4) combination was an upstream IPv4 packet snooped with a source IP address within an IPv4 subnet configured with the CM configuration file encoding Subscriber Management CPE IPv4 List (TLV 36)
CPE IP address	The IPv4 or IPv6 address of the CPE MAC address shown in the line. When displaying IPv4 IP addresses, the CableOS Core displays “(IPv6)” if the CPE MAC address is associated with only an IPv6 address. If the CableOS Core has not yet snooped DHCPv4 or DHCPv6 for a statically configured CPE MAC address, it displays a hyphen “-“. The “d4”, “d6”, “st4” and “st6” strings are deliberately shorter than the “interim” state strings to make it clear what (mac, IP) assignments are not yet completed. A future release may implement a feature enhancement “eMTA State Reporting” feature that adds the following STATE values: • emta(o) when an eMTA has forwarded a TFTP-GET request upstream, that is, it has started its “options” file transfer • emta(p) when an eMTA has completed provisioning by receiving its last downstream TFTP-DATA response • Other eMTA states

Related information

show cable modem
show cable modem bonding
show cable modem connectivity
show cable modem counters
show cable modem ipv6
show cable modem primary-channel
show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem cpe dhcp

To show a summary of the CPE DHCP known by the CableOS Core, use the `show cable modem cpe dhcp` command.

`show cable modem` [{ *single-cm cable-interfaces*] [| `ipv6`] | `cpe` | `dhcp` [| `verbose` }]

Syntax description

single-cm	Selects a CM.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
ipv6	(Optional) – shows information for CPEs in IPv6.
verbose	(Optional) – provides DHCP option parsing.

Command mode

Exec mode.

Usage guidelines

The command displays a list of CMs with associated CPE devices, as well as detailed information on CPE.

The `show cable modem cpe dhcp` command has a verbose and a non-verbose option. The non-verbose command shows CPE lease expiration time information, while the verbose option also shows parsing of DHCP options.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example will display summary information for a specific address:

```
show cable modem fc52.8d5e.7b09 cpe dhcp
```

Output columns

Field	Description
CM MAC Address	The Ethernet MAC address of the cable modem through which a CPE MAC address was learned. On each output line, the CM MAC address is separated from the rest of the line by a colon “:” to distinguish it from the CPE MAC address when filtering the command output. It is important for the colon to have a space before and after it so that double-clicking can select either the CM MAC address or the CPE IP address without including the colon.
HOST	The “host type” of the CPE is one of the following: • “emta” indicates an Embedded Media Transport Agent, detected by snooping the DHCP Vendor Class Identifier option (DHCPv4 option 60 or DHCPv6 option 16) • “cpe” indicates all other CPE host types. This includes both external CPEs and other embedded host types other than the ones mentioned above. • "estb" indicates an Embedded Set Top Box
CPE MAC ADDRESS	The Ethernet MAC address learned for a CPE host reached through the CM identified on the output line
CPE IP ADDRESS	The IPv4 or IPv6 address of the CPE MAC address shown in the line. When displaying IPv4 IP addresses, the COS CORE displays “(ipv6)” if the CPE MAC address is associated with only an IPv6 address. If the COS CORE has not yet snooped DHCPv4 or DHCPv6 for a statically configured CPE MAC address, it displays a hyphen "-".
DHCP LEASEEXPIRATION	The expiration time of CPE lease time
CM DHCP DISCOVERY/SOLICIT	CM DHCP discovery options

Related information

show cable modem
show cable modem bonding
show cable modem connectivity
show cable modem counters
show cable modem ipv6
show cable modem primary-channel

show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem dhcp

Use the `show cable modem dhcp` command to show a summary of the DHCP CM options known by the CableOS Core.

`show cable modem` [{ `ipv6` }] [*single-cm cable-interfaces*] `dhcp` [`verbose`]

Syntax description

single-cm	Selects a CM.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
ipv6	(Optional) Shows information for CMs in IPv6.
verbose	(Optional) Provides DHCP option parsing.

Command mode

Exec mode.

Usage guidelines

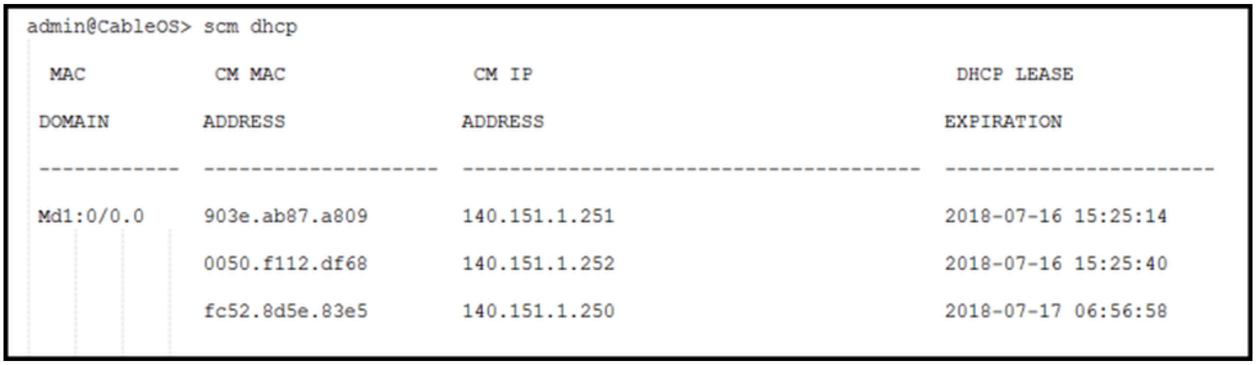
This command displays DHCP options information for cable modems on all or specified cable interfaces.

The `show cable modem dhcp` command has a verbose and a non-verbose option. The non-verbose command shows lease expiration time information. The verbose option shows parsing of DHCP options.

Examples

The following example displays summary information about the DHCP options:

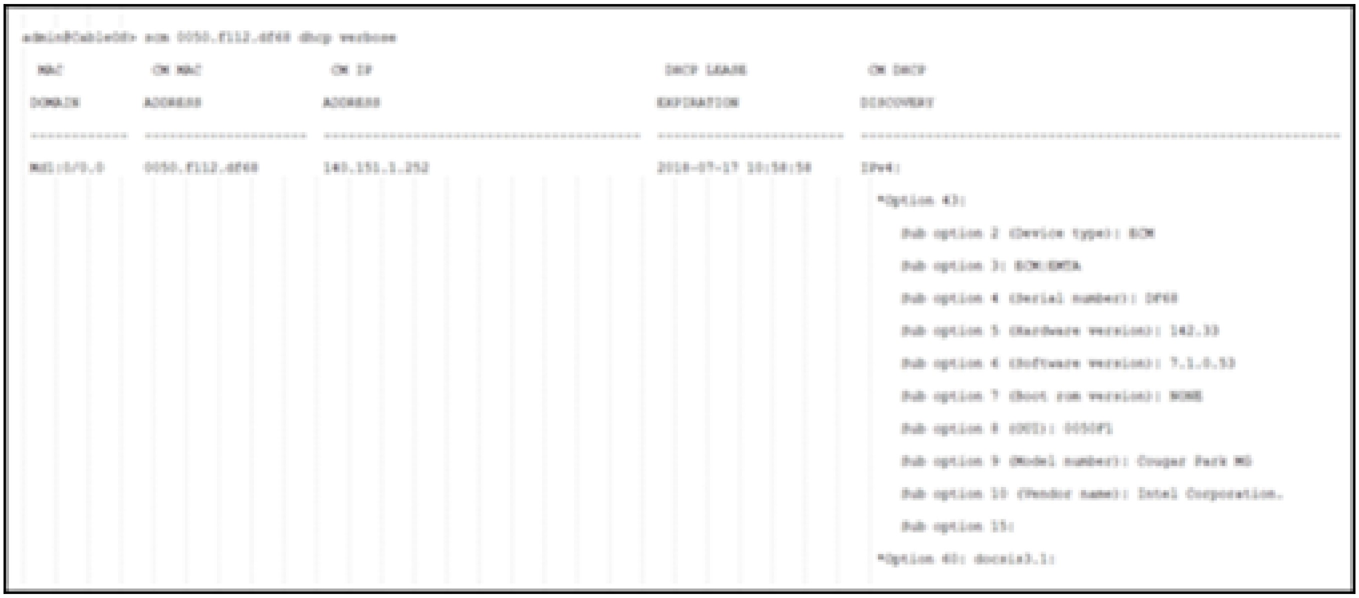
```
show cable modem dhcp
```



```
admin@CableOS> scm dhcp
 MAC           CM MAC                 CM IP                                     DHCP LEASE
DOMAIN        ADDRESS               ADDRESS                                    EXPIRATION
------------  --------------------  ----------------------------------------  -----------------------
Md1:0/0.0     903e.ab87.a809        140.151.1.251                              2018-07-16 15:25:14
              0050.f112.df68        140.151.1.252                              2018-07-16 15:25:40
              fc52.8d5e.83e5        140.151.1.250                              2018-07-17 06:56:58
```

The following example displays full information about the DHCP options on a specific CM:

```
scm 0050.f112.df68 dhcp verbose
```



```
admin@CableOS> scm 0050.f112.df68 dhcp verbose
 MAC          CM MAC               CM IP                                    DHCP LEASE                CM DHCP
DOMAIN       ADDRESS              ADDRESS                                  EXPIRATION               DISCOVERY
------------ -------------------- ---------------------------------------- ------------------------ ------------------------------------------------------------------------------
Md1:0/0.0    0050.f112.df68       140.151.1.252                            2018-07-17 10:58:58      IPv4:
                                                                                                     *Option 43:
                                                                                                        Sub option 2 (Device type): ECM
                                                                                                        Sub option 3: ECM:EMTA
                                                                                                        Sub option 4 (Serial number): DF68
                                                                                                        Sub option 5 (Hardware version): 142.33
                                                                                                        Sub option 6 (Software version): 7.1.0.53
                                                                                                        Sub option 7 (Boot rom version): NONE
                                                                                                        Sub option 8 (OUI): 0050F1
                                                                                                        Sub option 9 (Model number): Cougar Park MG
                                                                                                        Sub option 10 (Vendor name): Intel Corporation.
                                                                                                        Sub option 15:
                                                                                                     *Option 60: docsis3.1:
```

Output columns

Field	Description
CM MAC Address	The MAC address of the CM
CM IP Address	The IP address of the CM
DHCP LEASE EXPIRATION	The expiration time of CM lease time
CM DHCP DISCOVERY/SOLICIT	CM DHCP discovery/solicit options

Related information

show cable modem

show cable modem bonding

show cable modem connectivity
show cable modem counters
show cable modem ipv6
show cable modem primary-channel
show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem docsis device-class

To display DOCSIS device-class information for all cable modems for a single cable interface or for a range of cable interfaces, use the `show cable modem docsis device-class` command.

```
show cable modem [ cable-interfaces ] docsis device-class [ summary ] total]
```

Syntax description

cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
summary	(Optional) Displays a summary of DOCSIS device class information for cable modems on all or specified cable interfaces on the CMTS router.
total	(Optional) Displays a total of DOCSIS device-class information for the cable modems connected to all interfaces, or to the specified cable interfaces.

Command mode

Exec mode.

Usage guidelines

This command displays a summary or a total of DOCSIS device-class information for all cable modems for a single cable interface or for a range of cable interfaces.

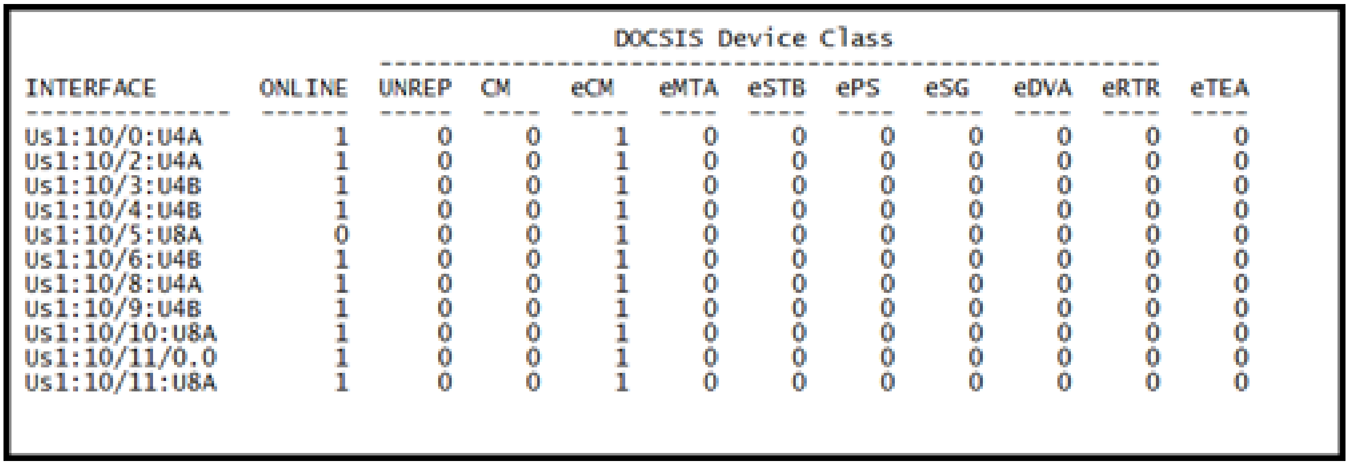
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example displays summary DOCSIS device-class information for all cable modems attached to the CableOS Core:

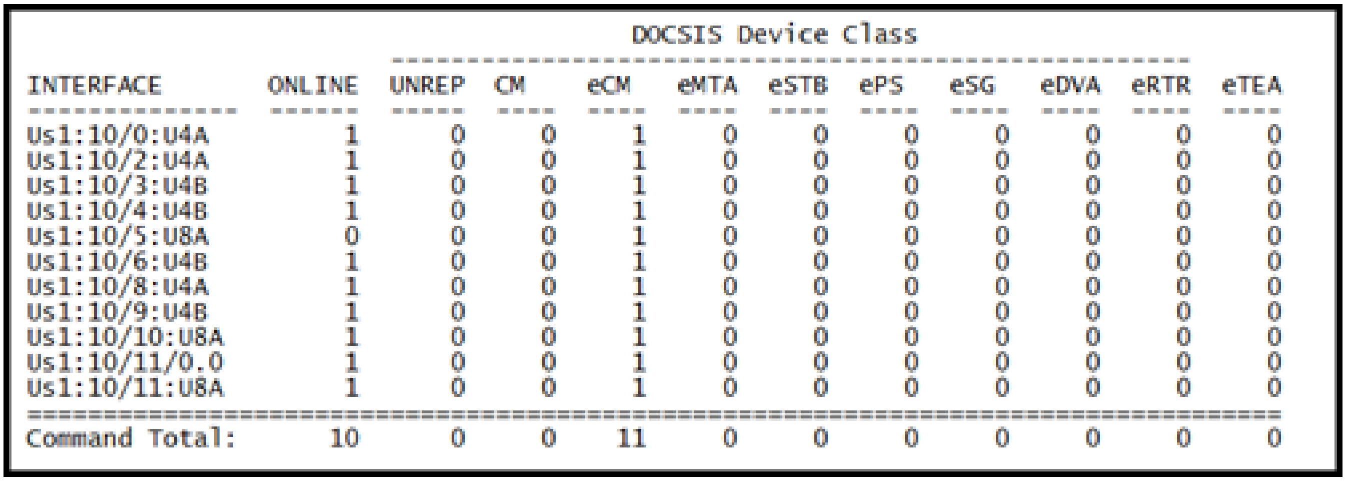
```
show cable modem docsis device-class summary
```



```
                                             DOCSIS Device Class
                                ---------------------------------------------------
INTERFACE          ONLINE  UNREP  CM     eCM   eMTA  eSTB  ePS   eSG   eDVA  eRTR  eTEA
--------------     ------  -----  ----   ----  ----  ----  ----  ----  ----  ----  ----
Us1:10/0:U4A            1      0     0      1     0     0     0     0     0     0     0
Us1:10/2:U4A            1      0     0      1     0     0     0     0     0     0     0
Us1:10/3:U4B            1      0     0      1     0     0     0     0     0     0     0
Us1:10/4:U4B            1      0     0      1     0     0     0     0     0     0     0
Us1:10/5:U8A            0      0     0      1     0     0     0     0     0     0     0
Us1:10/6:U4B            1      0     0      1     0     0     0     0     0     0     0
Us1:10/8:U4A            1      0     0      1     0     0     0     0     0     0     0
Us1:10/9:U4B            1      0     0      1     0     0     0     0     0     0     0
Us1:10/10:U8A           1      0     0      1     0     0     0     0     0     0     0
Us1:10/11/0.0           1      0     0      1     0     0     0     0     0     0     0
Us1:10/11:U8A           1      0     0      1     0     0     0     0     0     0     0
```

The following example displays summary and total DOCSIS device-class information about all cable modems attached to the CableOS Core:

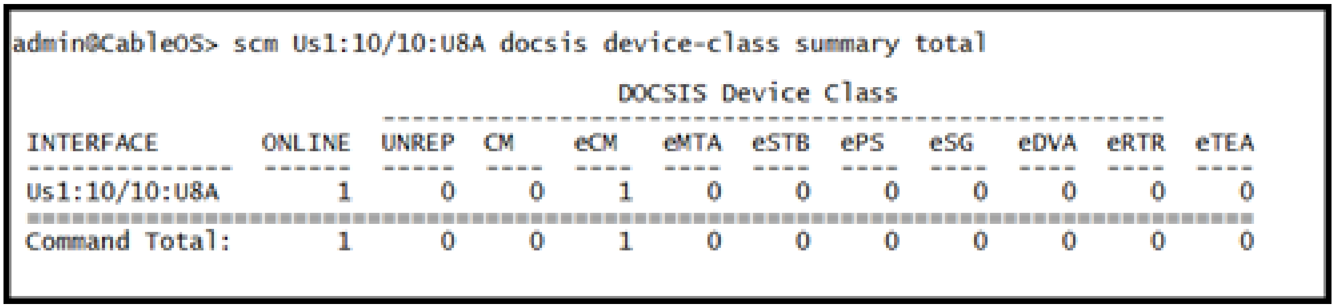
```
show cable modem docsis device-class summary total
```



```
                                          DOCSIS Device Class
                           -------------------------------------------------------
INTERFACE        ONLINE   UNREP  CM     eCM    eMTA   eSTB   ePS    eSG    eDVA   eRTR   eTEA
---------------  ------   -----  ----   ----   ----   ----   ----   ----   ----   ----   ----
Us1:10/0:U4A          1       0      0      1      0      0      0      0      0      0      0
Us1:10/2:U4A          1       0      0      1      0      0      0      0      0      0      0
Us1:10/3:U4B          1       0      0      1      0      0      0      0      0      0      0
Us1:10/4:U4B          1       0      0      1      0      0      0      0      0      0      0
Us1:10/5:U8A          0       0      0      1      0      0      0      0      0      0      0
Us1:10/6:U4B          1       0      0      1      0      0      0      0      0      0      0
Us1:10/8:U4A          1       0      0      1      0      0      0      0      0      0      0
Us1:10/9:U4B          1       0      0      1      0      0      0      0      0      0      0
Us1:10/10:U8A         1       0      0      1      0      0      0      0      0      0      0
Us1:10/11/0.0         1       0      0      1      0      0      0      0      0      0      0
Us1:10/11:U8A         1       0      0      1      0      0      0      0      0      0      0
================================================================================================
Command Total:       10       0      0     11      0      0      0      0      0      0      0
```

The following example displays summary total DOCSIS device-class information about a specific interface attached to the CableOS Core:

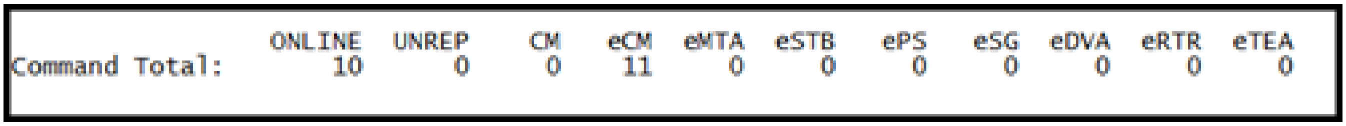
```
show cable modem Us1:10/10:U8A docsis device-class summary total
```



```
admin@CableOS> scm Us1:10/10:U8A docsis device-class summary total
                                          DOCSIS Device Class
                           -------------------------------------------------------
INTERFACE        ONLINE   UNREP  CM     eCM    eMTA   eSTB   ePS    eSG    eDVA   eRTR   eTEA
---------------  ------   -----  ----   ----   ----   ----   ----   ----   ----   ----   ----
Us1:10/10:U8A         1       0      0      1      0      0      0      0      0      0      0
================================================================================================
Command Total:        1       0      0      1      0      0      0      0      0      0      0
```

The following example displays total DOCSIS device-class information for all cable modems attached to the CableOS Core:

```
show cable modem docsis device-class total
```



```
                  ONLINE   UNREP     CM    eCM   eMTA   eSTB    ePS    eSG   eDVA   eRTR   eTEA
Command Total:        10       0      0     11      0      0      0      0      0      0      0
```

Output columns

Field	Description
Interface	Name of the cable interface and associated upstreams on the CableOS system
ONLINE	Total number of cable modems currently online on this cable interface
unrep	Total number of cable modems on this interface for which the device-class information is unreported or unavailable
CM	Total number of cable modems on this interface that have a reported device class as a standalone cable modem

Field	Description
eCM	Total number of cable modems on this interface that have reported the device class as an embedded cable modem
eMTA	Total number of cable modems on this interface that have reported the device class as an embedded multimedia terminal adapter
eSTB	Total number of cable modems on this interface that have reported the device class as an embedded set-top box
ePS	Total number of cable modems on this interface that have reported the device class as an embedded portal service element
eSG	Total number of cable modems on this interface that have reported the device class as an embedded Security, Monitoring, and Automation (SMA) gateway
eDVA	Total number of cable modems on this interface that have reported the device class as an embedded Digital Voice Adapter
eRTR	Total number of cable modems on this interface that have reported the device class as an embedded router
eTEA	Total number of cable modems on this interface that have reported the device class as an embedded TDM Emulator Adapter
Total	The total number of all cable modems reported online and for a given DOCSIS device class across all cable interfaces on a CableOS Core

Related information

show cable modem

show cable modem bonding

show cable modem connectivity

show cable modem counters

show cable modem docsis version

show cable modem ipv6

show cable modem primary-channel

show cable modem qos

show cable modem service-flow

show cable modem summary

show cable modem vendor

show cable modem verbose

show cable modem docsis version

Use the `show cable modem docsis version` command to display the DOCSIS version information for cable modems on one or more cable interfaces and upstreams.

```
show cable modem [ { single-cm  | cable-interfaces ] | docsis version [  |
summary ] [  | total } ]
```

Syntax description

single-cm	Selects a CM.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
summary	(Optional) Displays a summary of DOCSIS device class information for CMs on all or specified cable interfaces on the CMTS router.
total	(Optional) Displays a total of DOCSIS device-class information for the CMs connected to all interfaces, or to the specified cable interfaces.

Command mode

Exec mode.

Usage guidelines

This command displays a summary of DOCSIS version information for all cable modems for a single cable interface or upstream, or for a range of cable interfaces or upstreams.

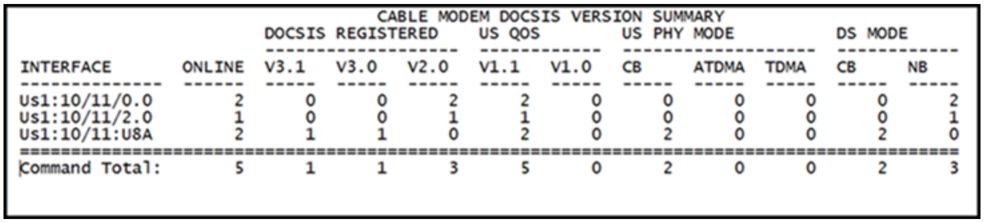
Examples

The following example will display DOCSIS information for all cable modems attached to the CableOS Core:

```
show cable modem docsis version
```

The following example will display a summary of the DOCSIS device class or version information for all cable modems attached to the CableOS Core:

```
show cable modem docsis version summary
```



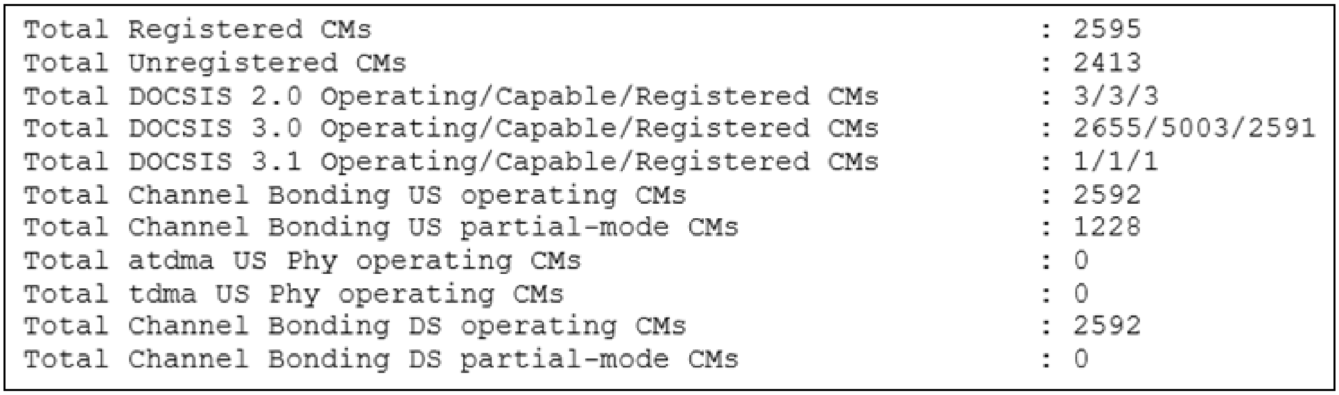
```
                                     CABLE MODEM DOCSIS VERSION SUMMARY
                      DOCSIS REGISTERED US QOS      US PHY MODE       DS MODE
                      ----------------- ----------- ----------------- -----------
INTERFACE      ONLINE V3.1  V3.0  V2.0  V1.1  V1.0  CB    ATDMA TDMA  CB    NB
-------------- ------ ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
Us1:10/11/0.0       2     0     0     2     2     0     0     0     0     0     2
Us1:10/11/2.0       1     0     0     1     1     0     0     0     0     0     1
Us1:10/11:U8A       2     1     1     0     2     0     2     0     0     2     0
=================================================================================
Command Total:      5     1     1     3     5     0     2     0     0     2     3
```

Output columns

Field	Description
DEFAULTDOWNSTREAM	For modems not operating with downstream bonding, this field shows the primary downstream channel in the form DsSS/P/CCC for Exo-R slot SS, Exo-R port P, and down-channel CCC. For modems operating with downstream bonding, the Downstream column identifies a downstream bonding group of the default downstream service flow with DsSS/P:DDDD where SS is an Exo-R slot, P is an Exo-R port, and DDDD is a port-level downstream bonding group name. The CableOS Core assigns a single downstream bonding group to downstream bonded CMs.
DEFAULTUPSTREAM	For modems not operating with upstream bonding, this column shows the upstream logical channel in the form UsSS/P/C/L for Exo-R slot SS, Exo-R port P, us-phy-channel C, and us-logical-channel L. For modems operating with upstream bonding, the Upstream column identifies an Upstream bonding group with DsSS/P:UUU where SS is an Exo-R slot, P is an Exo-R port, and UUU is the port-level upstream bonding group name.
CM MAC ADDRESS	The Ethernet MAC address of the cable modem
CM STATE	The state of the CM on its MAC domain
PRIM SID	The primary SID that identifies a cable modem
REG VER	Displays the highest supported version of DOCSIS that the CM supports. The possible values are: 2.0, 3.0 and 3.1. Shows “-” if the modem is not online.
QOS PROV	Displays the version of DOCSIS for which the CM is currently provisioned and registered. The possible values are: 1.0 or 1.1. Shows “-” if the modem is not online.
US PHY MODE	Displays the DOCSIS operating mode for the CM, with the following possible values: • TDMA—DOCSIS 1.X, Time Division Multiple Access (TDMA)-only mode • ATDMA—DOCSIS 2.0 Advanced Time Division Multiple Access (A-TDMA) mode
DS CHL MODE	Displays the downstream channel mode for the CM, with the following possible values: • NB— non-bonded • CB— channel-bonded
DOCSIS REGISTERED	Total number of cable modems registered on this cable interface with the specified DOCSIS version (x.y) capabilities
US QOS	Total number of cable modems whose upstreams are currently operating in a specified DOCSIS version (x.y) quality of service

The following example displays a total of DOCSIS device-class information for the CMs connected to all interfaces, or to the specified cable interfaces.

```
show cable modem docsis version total
```



```
Total Registered CMs                                      : 2595
Total Unregistered CMs                                    : 2413
Total DOCSIS 2.0 Operating/Capable/Registered CMs         : 3/3/3
Total DOCSIS 3.0 Operating/Capable/Registered CMs         : 2655/5003/2591
Total DOCSIS 3.1 Operating/Capable/Registered CMs         : 1/1/1
Total Channel Bonding US operating CMs                    : 2592
Total Channel Bonding US partial-mode CMs                 : 1228
Total atdma US Phy operating CMs                          : 0
Total tdma US Phy operating CMs                           : 0
Total Channel Bonding DS operating CMs                    : 2592
Total Channel Bonding DS partial-mode CMs                 : 0
```

Related information

show cable modem

show cable modem bonding

show cable modem connectivity

show cable modem counters

show cable modem docsis device-class

show cable modem ipv6

show cable modem primary-channel

show cable modem qos

show cable modem service-flow

show cable modem summary

show cable modem vendor

show cable modem verbose

show cable modem ipv6

To display IPv6 information for specified cable modems and customer premise equipment (CPE) devices behind a CM, use the `show cable modem ipv6` command.

```
show cable modem [{ip-address | mac-address | cable |{slot/port} |{slot//
cable-interface-index} [ | upstream port ] | ipv6 [ | cpe | prefix |
registered | unregistered} ]
```

Syntax description

`ip-address`	(Optional)- IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.
`mac-address`	(Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.
`cable`	Identifies the cable interface.
`slot`	Slot where the line card resides.

`port`	Downstream port number.
`upstream port`	(Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for ports begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card.
`cpe`	(Optional) Displays IPv6 information for the CPE devices behind the CM with the specified IPv4 or IPv6 address.
`prefix`	(Optional) Displays the IPv6 prefix of the network.
`registered`	(Optional) Displays IPv6 information for registered CMs.
`unregistered`	(Optional) Displays IPv6 information for unregistered CMs.

Command mode

Exec mode.

Usage guidelines

Variations of the `show cable modem ipv6` command can output multiple lines per modem. One example is when a separate line is shown for each CPE reached through the CM with `show cable modem cpe`. In this case, the continuation of information for a cable modem is indicated with a plus sign “+” in the first column of the continuation line.

Examples

The following example will display all information about the CM at the given IPv6 address:

```
show cable modem 001d.ce66.c124 ipv6
```

Output columns

Field	**Description**
MAC Address	MAC address of this CM
Type	Type of device that this CM is functioning as, with the following possible values: • B/D—CM as bridge using DHCP address assignment • G/D—CPE router using DHCP address assignment • C/A—CPE using Stateless Address Auto-Configuration (SLAAC) address assignment
Interface	Cable line card interface and upstream associated with this CM
MAC State	The current state of the MAC layer for this CM
IP Address	IP address acquired by the CM. Prior to acquisition of the IP address, or if the CM fails registration, the following output is shown:

Field	Description
	• IPv4 address not yet acquired—”0.0.0.0” • IPv6 address not yet acquired—“::” • CM fails IPv6 registration, but online with IPv4 address or CM fails IPv4 registration, but online with IPv6 address: “---” • IPv6 address of IPv4-only CM, or IPv4 address of an IPv6-only CM: “---”
Domain name	Domain name for the CM

Related information

show cable modem

show cable modem bonding

show cable modem connectivity

show cable modem counters

show cable modem cpe

show cable modem primary-channel

show cable modem qos

show cable modem service-flow

show cable modem summary

show cable modem vendor

show cable modem verbose

show cable modem lcce

To display the mapping between LCCEs and specified cable modems, use the `show cable modem lcce` command.

```
show cable modem [ { cm_ip  | cm_mac  | rf_port  | mac_domain ]  | lcce [  |
lcce_ip  } ]
```

Syntax description

`cm_ip`	(Optional)- IPv4 or IPv6 address of a specific CM to be displayed.
`cm_mac`	(Optional) MAC address of a specific CM to be displayed.
`rf-port`	(Optional) Displays information for all CMs using the specified port.
`mac-domain`	(Optional) Displays information for all the CMs in the specified MAC domain.
`lcce_ip`	The IP address of a specific LCCE.

Command mode

Exec mode.

Usage guidelines

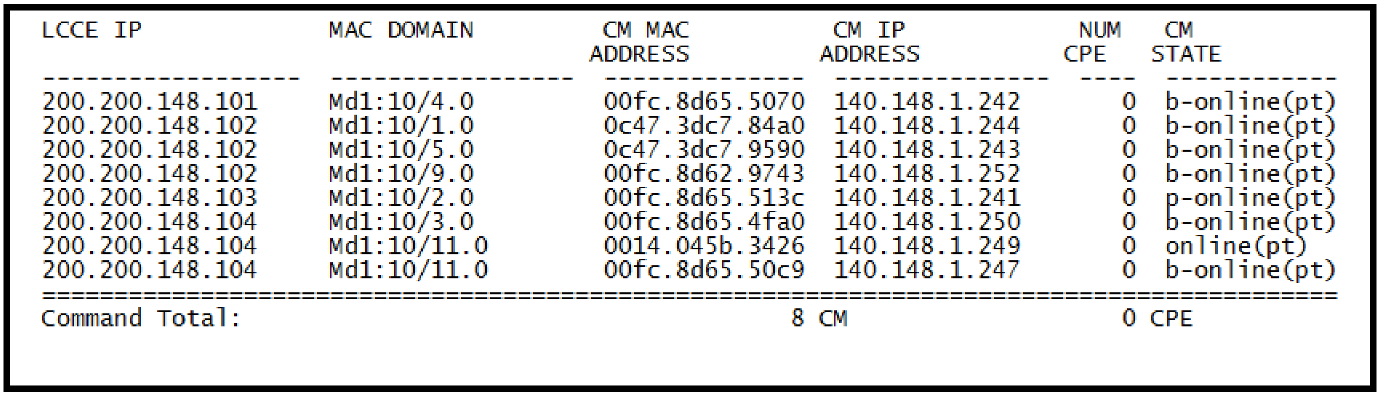
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ----------------------------------------------------------------------------
 x
```

Examples

The following example will display all CM information for all LCCEs:

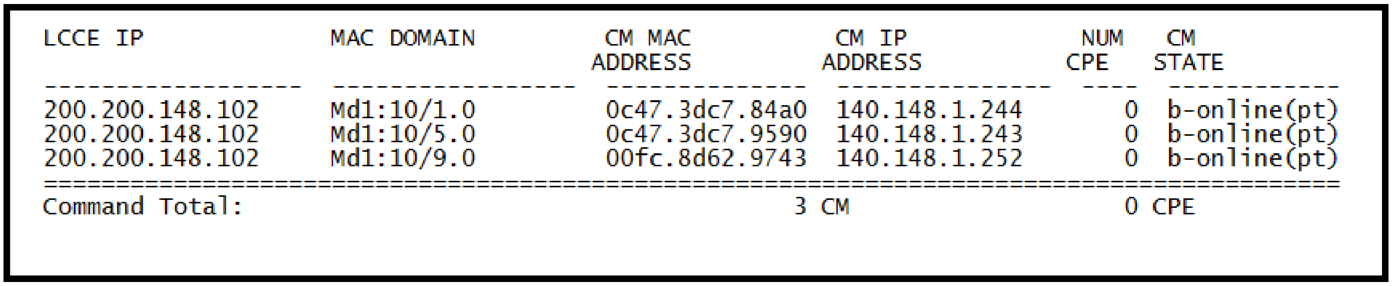
```
show cable modem lcce
```



```
LCCE IP              MAC DOMAIN           CM MAC           CM IP            NUM   CM
                                         ADDRESS          ADDRESS          CPE   STATE

-------------------  ------------------  ---------------  ----------------  ----  ------------
200.200.148.101      Md1:10/4.0          00fc.8d65.5070   140.148.1.242        0  b-online(pt)
200.200.148.102      Md1:10/1.0          0c47.3dc7.84a0   140.148.1.244        0  b-online(pt)
200.200.148.102      Md1:10/5.0          0c47.3dc7.9590   140.148.1.243        0  b-online(pt)
200.200.148.102      Md1:10/9.0          00fc.8d62.9743   140.148.1.252        0  b-online(pt)
200.200.148.103      Md1:10/2.0          00fc.8d65.513c   140.148.1.241        0  p-online(pt)
200.200.148.104      Md1:10/3.0          00fc.8d65.4fa0   140.148.1.250        0  b-online(pt)
200.200.148.104      Md1:10/11.0         0014.045b.3426   140.148.1.249        0  online(pt)
200.200.148.104      Md1:10/11.0         00fc.8d65.50c9   140.148.1.247        0  b-online(pt)
==============================================================================================
Command Total:                                              8 CM                   0 CPE
```

The following example will display all CM information for a specific LCCE:

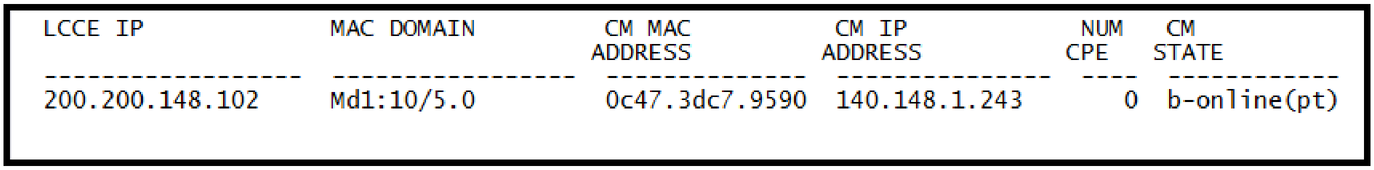
```
show cable modem lcce 200.200.148.102
```



```
LCCE IP              MAC DOMAIN           CM MAC           CM IP            NUM   CM
                                         ADDRESS          ADDRESS          CPE   STATE

-------------------  ------------------  ---------------  ----------------  ----  ------------
200.200.148.102      Md1:10/1.0          0c47.3dc7.84a0   140.148.1.244        0  b-online(pt)
200.200.148.102      Md1:10/5.0          0c47.3dc7.9590   140.148.1.243        0  b-online(pt)
200.200.148.102      Md1:10/9.0          00fc.8d62.9743   140.148.1.252        0  b-online(pt)
==============================================================================================
Command Total:                                              3 CM                   0 CPE
```

The following example will display the LCCE information about a specific CM IP address:

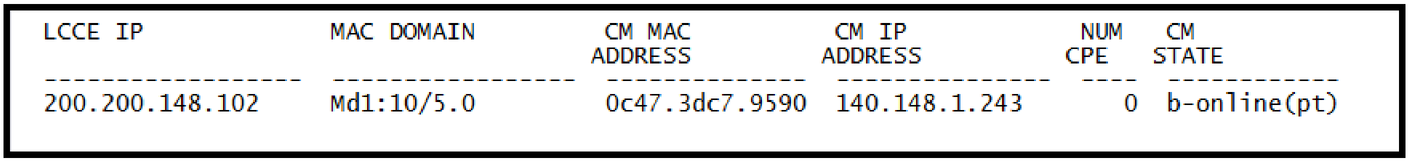
```
show cable modem 140.148.1.243 lcce
```



```
LCCE IP             MAC DOMAIN           CM MAC          CM IP            NUM   CM
                                        ADDRESS         ADDRESS          CPE   STATE
------------------  -------------------  --------------  ---------------  ----  ------------
200.200.148.102     Md1:10/5.0           0c47.3dc7.9590  140.148.1.243       0  b-online(pt)
```

The following example will display the LCCE information about a specific CM MAC address:

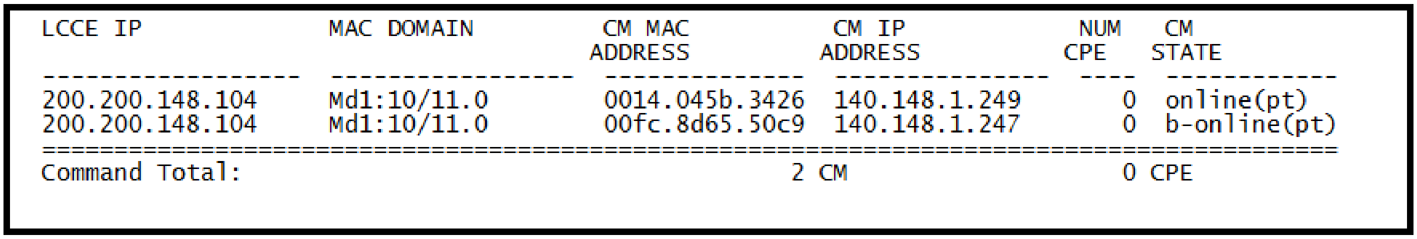
```
show cable modem 0c47.3dc7.9590 lcce
```



```
LCCE IP             MAC DOMAIN           CM MAC          CM IP            NUM   CM
                                        ADDRESS         ADDRESS          CPE   STATE
------------------  -------------------  --------------  ---------------  ----  ------------
200.200.148.102     Md1:10/5.0           0c47.3dc7.9590  140.148.1.243       0  b-online(pt)
```

The following example will display information about all LCCEs in a specific MAC domain.:

```
show cable modem Md1:10/11.0 lcce
```



```
LCCE IP             MAC DOMAIN           CM MAC          CM IP            NUM   CM
                                        ADDRESS         ADDRESS          CPE   STATE
------------------  -------------------  --------------  ---------------  ----  ------------
200.200.148.104     Md1:10/11.0          0014.045b.3426  140.148.1.249       0  online(pt)
200.200.148.104     Md1:10/11.0          00fc.8d65.50c9  140.148.1.247       0  b-online(pt)
============================================================================================
Command Total:                                        2 CM                    0 CPE
```

Related information

show lcce

show cable modem leasequery-filter

Use the `show cable modem leasequery-filter` command to report the counts by cable modem of DHCP LEASEQUERY messages sent or filtered by the CableOS Core in response to upstream packets from an unknown source IP address.

`show cable modem` { *cable modem identifiers* | *cable interface identifiers* } `leasequery-filter` [{ `min-filtered` *min-filtered*] [| `total`] [| `ipv4` | `ipv6` }]

Syntax description

cable modem identifiers	(Optional) Selects a single CM for which to display LEASEQUERY counts.

cable interface identifiers	(Optional) Selects all CMs using the *cable interface identifiers* specified for which to display LEASEQUERY counts. Only upstream-phy-channel, us-rf-port and MAC domain filters are supported. When neither single-cm nor cable-interfaces is specified, the CableOS Core displays per-CM counts for all CMs that have a non-zero SENT count.
min-filtered	(Optional) Integer range 1..65535. Displays LEASEQUERY counts for an individual CM only when the CableOS Core has filtered at least *min-filtered* LEASEQUERY messages triggered by upstream packets from the CM.
`total`	(Optional) Displays only the totals of the CMs selected.
`ipv4`	(Optional) Displays counts for only LEASEQUERYs triggered due to unknown IPv4 version addresses.
`ipv6`	(Optional) Displays counts for only LEASEQUERYs filtered due to unknown IPv6 version addresses.

Command mode

Exec mode.

Usage guidelines

Without additional arguments, the `show cable modem leasequery-filter` command displays LEASEQUERY counts for all CMs with non-zero counts since the counts were last cleared.

The SENT column is the number of unfiltered LEASEQUERY messages triggered by an upstream packet from the CM with an unknown source IP address. The FILTERED column is the number of LEASEQUERY messages dropped due to exceeding the requests-per-sec rate configured for the cable bundle containing the CM.

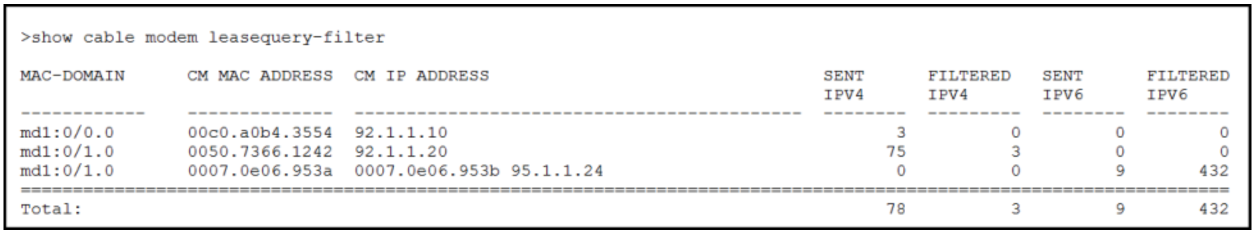
For LEASEQUERY packets triggered by upstream traffic, sent and filtered counts are maintained on a per-CM basis for each IP version.

LEASEQUERY counts are not maintained across an LCCE switchover; the acquiring server clears all counts.

All versions of this command show the total of the SENT and FILTERED columns selected by the command, with separate totals for IPv4 and IPv6. The *total* keyword displays only these overall command total lines.

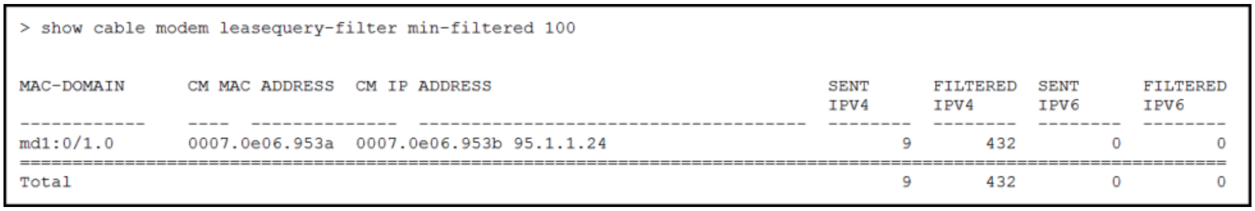
Example

The following shows the default version of the show command with no additional arguments. It displays all non-zero counts for all CMs on the CableOS Core.



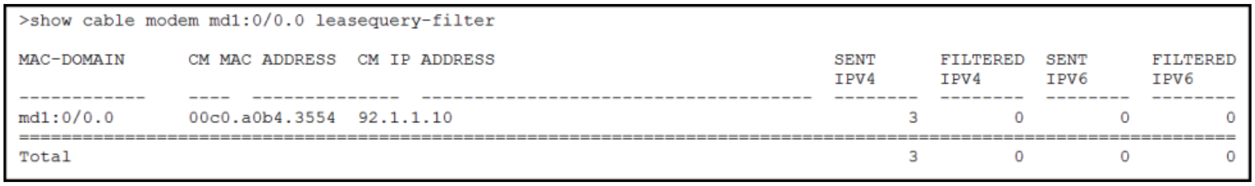
```
>show cable modem leasequery-filter

MAC-DOMAIN        CM MAC ADDRESS   CM IP ADDRESS                                       SENT       FILTERED   SENT       FILTERED
                                                                                       IPV4       IPV4       IPV6       IPV6
------------      --------------   ----------------------------------------------      --------   ---------  --------   --------
md1:0/0.0         00c0.a0b4.3554   92.1.1.10                                                  3          0          0          0
md1:0/1.0         0050.7366.1242   92.1.1.20                                                 75          3          0          0
md1:0/1.0         0007.0e06.953a   0007.0e06.953b 95.1.1.24                                   0          0          9        432
==================================================================================================================================
Total:                                                                                       78          3          9        432
```

The following example limits the display to those CMs that exceed a specified minimum number of filtered LEASEQUERYs.



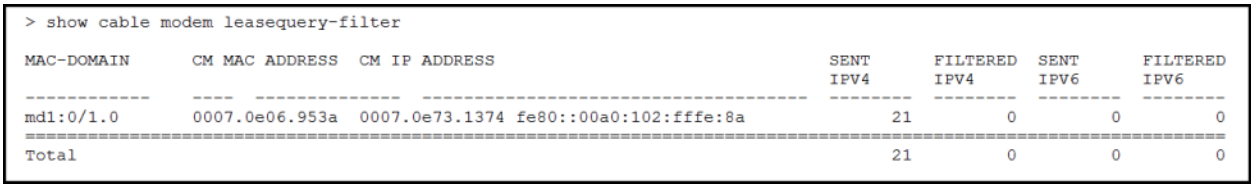
```
> show cable modem leasequery-filter min-filtered 100


MAC-DOMAIN        CM MAC ADDRESS   CM IP ADDRESS                                        SENT       FILTERED   SENT       FILTERED
                                                                                        IPV4       IPV4       IPV6       IPV6
------------      ----  --------------   --------------------------------------        --------   --------   --------   --------
md1:0/1.0         0007.0e06.953a   0007.0e06.953b 95.1.1.24                                    9        432          0          0
==================================================================================================================================
Total                                                                                          9        432          0          0
```

The following example limits the per-CM display to the CMs of a single MAC domain.



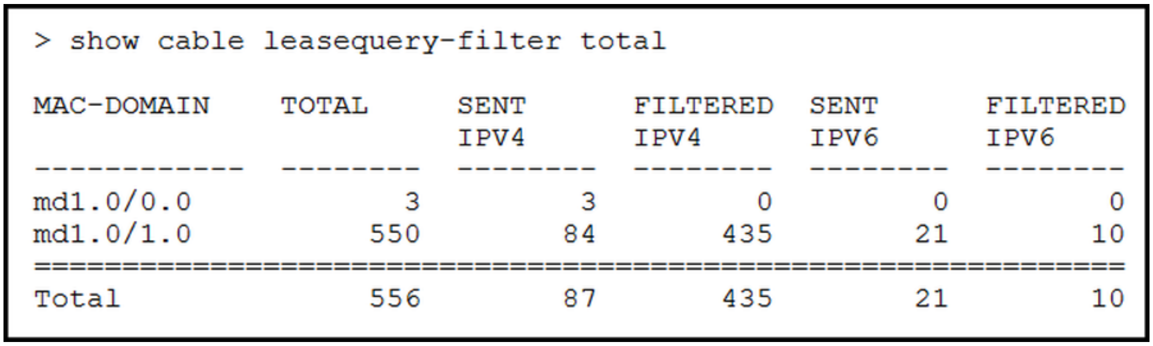
```
>show cable modem md1:0/0.0 leasequery-filter

MAC-DOMAIN        CM MAC ADDRESS   CM IP ADDRESS                                        SENT       FILTERED   SENT       FILTERED
                                                                                        IPV4       IPV4       IPV6       IPV6
------------      ----  --------------   --------------------------------------        --------   --------   --------   --------
md1:0/0.0         00c0.a0b4.3554   92.1.1.10                                                   3          0          0          0
==================================================================================================================================
Total                                                                                          3          0          0          0
```

The following example limits the per-CM display to only CMs with non-zero LEASEQUERY counts for upstream packets with unknown source addresses.



```
> show cable modem leasequery-filter

MAC-DOMAIN        CM MAC ADDRESS   CM IP ADDRESS                                        SENT       FILTERED   SENT       FILTERED
                                                                                        IPV4       IPV4       IPV6       IPV6
------------      ----  --------------   --------------------------------------        --------   --------   --------   --------
md1:0/1.0         0007.0e06.953a   0007.0e73.1374 fe80::00a0:102:fffe:8a                      21          0          0          0
==================================================================================================================================
Total                                                                                         21          0          0          0
```

The following example with "total" shows the total for each mac-domain.



```
> show cable leasequery-filter total

MAC-DOMAIN     TOTAL      SENT       FILTERED   SENT       FILTERED
                          IPV4       IPV4       IPV6       IPV6
------------   --------   --------   --------   --------   --------
md1.0/0.0             3          3          0          0          0
md1.0/1.0           550         84        435         21         10
===================================================================
Total               556         87        435         21         10
```

Output columns

Field	Description
MAC-DOMAIN	The MAC domain
TOTAL	The total number of DHCP LEASEQUERY request messages that have been sent or filtered
SENT IPV4	The number of IPv4 DHCP LEASEQUERY request messages that have been sent
FILTERED IPV4	The number of IPv4 DHCP LEASEQUERY request messages that have been filtered
SENT IPV6	The number of IPv6 DHCP LEASEQUERY request messages that have been sent
FILTERED IPV6	The number of IPv6 DHCP LEASEQUERY request messages that have been filtered

Related information

cable bundle source-verify leasequery downstream
cable bundle source-verify leasequery upstream
show cable downstream leasequery-filter

show cable modem load-balance group

To display information about assignment of CMs to LBGs, use the `show cable modem load-balance group` command:

`show cable modem` [`cable-interfaces`] `load-balance group` [`restricted`]

Syntax description

`cable-interfaces`	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only the CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
`summary`	(Optional) Show information only for RLBGs.

Default

There is no default for this command.

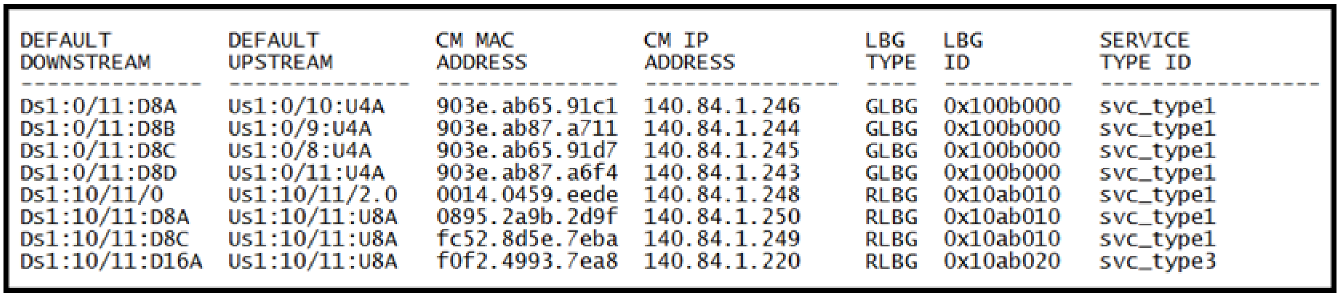
Command mode

Exec mode.

Examples

The following example shows information for all CMs:

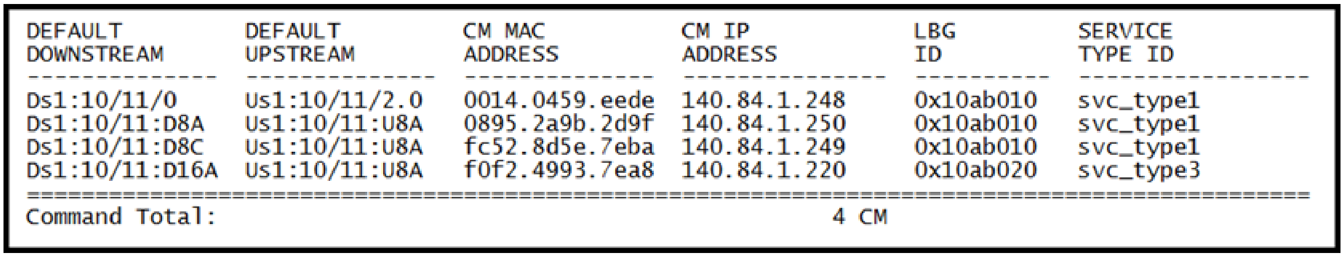
```
show cable modem load-balance group
```



```
DEFAULT         DEFAULT         CM MAC          CM IP            LBG    LBG          SERVICE
DOWNSTREAM      UPSTREAM        ADDRESS         ADDRESS          TYPE   ID           TYPE ID
--------------  --------------  --------------  ---------------  ----   ----------   -----------------
Ds1:0/11:D8A    Us1:0/10:U4A    903e.ab65.91c1  140.84.1.246     GLBG   0x100b000    svc_type1
Ds1:0/11:D8B    Us1:0/9:U4A     903e.ab87.a711  140.84.1.244     GLBG   0x100b000    svc_type1
Ds1:0/11:D8C    Us1:0/8:U4A     903e.ab65.91d7  140.84.1.245     GLBG   0x100b000    svc_type1
Ds1:0/11:D8D    Us1:0/11:U4A    903e.ab87.a6f4  140.84.1.243     GLBG   0x100b000    svc_type1
Ds1:10/11/0     Us1:10/11/2.0   0014.0459.eede  140.84.1.248     RLBG   0x10ab010    svc_type1
Ds1:10/11:D8A   Us1:10/11:U8A   0895.2a9b.2d9f  140.84.1.250     RLBG   0x10ab010    svc_type1
Ds1:10/11:D8C   Us1:10/11:U8A   fc52.8d5e.7eba  140.84.1.249     RLBG   0x10ab010    svc_type1
Ds1:10/11:D16A  Us1:10/11:U8A   f0f2.4993.7ea8  140.84.1.220     RLBG   0x10ab020    svc_type3
```

The following example shows information only for RLBGs:

```
show cable modem load-balance group restricted
```



```
DEFAULT         DEFAULT         CM MAC          CM IP            LBG          SERVICE
DOWNSTREAM      UPSTREAM        ADDRESS         ADDRESS          ID           TYPE ID
--------------  --------------  --------------  ---------------  ----------   -----------------
Ds1:10/11/0     Us1:10/11/2.0   0014.0459.eede  140.84.1.248     0x10ab010    svc_type1
Ds1:10/11:D8A   Us1:10/11:U8A   0895.2a9b.2d9f  140.84.1.250     0x10ab010    svc_type1
Ds1:10/11:D8C   Us1:10/11:U8A   fc52.8d5e.7eba  140.84.1.249     0x10ab010    svc_type1
Ds1:10/11:D16A  Us1:10/11:U8A   f0f2.4993.7ea8  140.84.1.220     0x10ab020    svc_type3
================================================================================================
Command Total:                                                  4 CM
```

Related information

cable load-balance general default

cable mac-domain * load-balance restricted

show cable load-balance group summary

show cable load-balance group restricted

show cable modem mtu

Use the `show cable modem mtu` command to display the DOCSIS MTU for specified cable modems.

`show cable modem` [*ip-address* | *mac-address* { `cable` |{ *slot* / *port slot* | *slot* / *cable-interface-index* } }] `mtu`

Syntax description

ip-address	(Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.
mac-address	(Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.
cable	Identifies the cable interface on the router.
slot	Slot where the line card resides.
port	Downstream port number.

Default

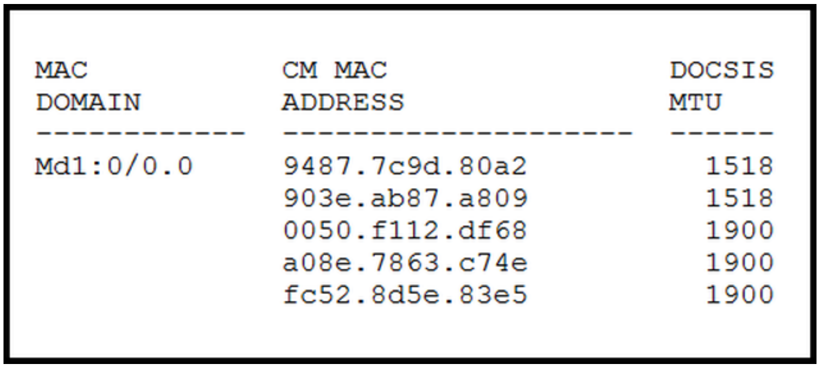
This command has no default value.

Command mode

Exec mode.

Example

The following example shows the output of a `show cable modem mtu` command:



```
MAC            CM MAC                DOCSIS
DOMAIN         ADDRESS               MTU
------------   --------------------  ------
Md1:0/0.0      9487.7c9d.80a2          1518
               903e.ab87.a809          1518
               0050.f112.df68          1900
               a08e.7863.c74e          1900
               fc52.8d5e.83e5          1900
```

Related information

cable mtu-enhance

system mtu

show cable modem ofdm-profile

Use the `show cable modem ofdm-profile` command to display the OFDM profile per Service Flow (SF) for specified cable modems.

`show cable modem` [{ *ip-address mac-address* }] `ofdm-profile` [`total`]

Syntax description

ip-address	(Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for the CM is displayed.
mac-address	(Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for the CM is displayed.

Command mode

Exec mode.

Usage guidelines

Variations of the command can output multiple lines per modem.

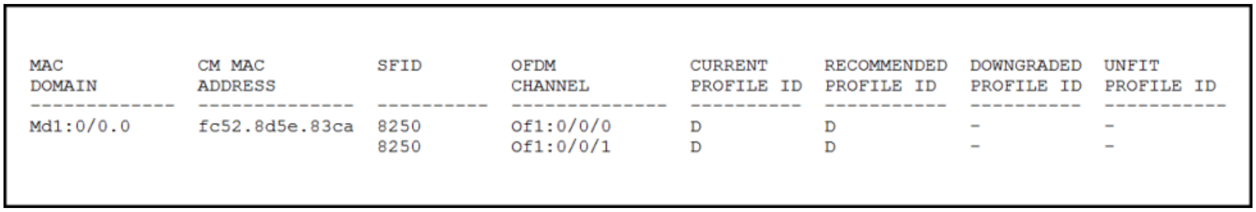
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example displays the output for a specific MAC address:

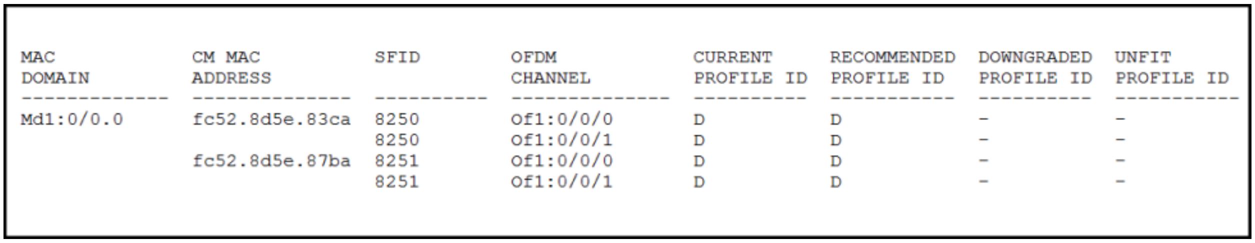
```
show cable modem fc52.8d5e.83ca ofdm-profile
```



```
MAC            CM MAC          SFID        OFDM            CURRENT     RECOMMENDED  DOWNGRADED  UNFIT
DOMAIN         ADDRESS                     CHANNEL         PROFILE ID  PROFILE ID   PROFILE ID  PROFILE ID
-------------  --------------  ----------  --------------  ----------  -----------  ----------  -----------
Md1:0/0.0      fc52.8d5e.83ca  8250        Of1:0/0/0       D           D            -           -
                               8250        Of1:0/0/1       D           D            -           -
```

The following example displays summary output for all CMs in a MAC domain:

```
show cable modem ofdm-profile
```



```
MAC            CM MAC          SFID       OFDM           CURRENT    RECOMMENDED DOWNGRADED UNFIT
DOMAIN         ADDRESS                    CHANNEL        PROFILE ID PROFILE ID  PROFILE ID PROFILE ID
-------------  --------------  ---------- -------------- ---------- ----------- ---------- -----------
Md1:0/0.0      fc52.8d5e.83ca  8250       Of1:0/0/0      D          D           -          -
                               8250       Of1:0/0/1      D          D           -          -
               fc52.8d5e.87ba  8251       Of1:0/0/0      D          D           -          -
                               8251       Of1:0/0/1      D          D           -          -
```

It is also possible to see the OFDM profiles for a single MAC domain, a specific downstream port, or for a downstream bonding group:

- For a MAC domain: `show cable modem Md1:0/0.0 ofdm-profile`
- For a downstream port: `show cable modem Ds1:0/0 ofdm-profile`
- For a downstream bonding group: `show cable modem Ds1:0/0:Dyn1 ofdm-profile`

Output columns

Field	Description
MAC Domain	The MAC domain for this CM
CM MAC Address	The MAC address of this CM
SFID	Service flow identifier
OFDM CHANNEL	Specifies the OFDM channel: Chassis/Card/Port
CURRENT PROFILE ID	Specifies a profile ID: (A, B, C... or NCP (No Current Profile)
RECOMMENDED PROFILE ID	Based on the Receive Modulation Error Ratio (RxMER) values, the CMTS finds among the existing profiles the one that may provide the highest speed, and yet at the same time may have sufficient Signal to Noise Ratio (SNR) margin for the modem to receive code words with acceptable error.
DOWNGRADED PROFILE ID	A CM sends a CM-STATUS Event 16 message to indicate a DS OFDM profile failure. When this indication is received by the CMTS, it takes immediate action to downgrade the modem to a lower profile.
UNFIT PROFILE ID	When the CMTS receives CM-STATUS Event 16 (DS OFDM Profile Failure), the profile indicated in the CM-STATUS message is marked as an 'unfit profile' for this modem.

show cable modem ofdma-profile

Use the `show cable modem ofdma-profile` command to display the OFDMA profile for each cable modem.

`show cable modem` [{ *ip-address* | *mac-address* }] `ofdma-profile` [`total`]

Syntax description

ip-address	(Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for the CM is displayed.
mac-address	(Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for the CM is displayed.

Default

This command has no default value.

Command mode

Exec mode

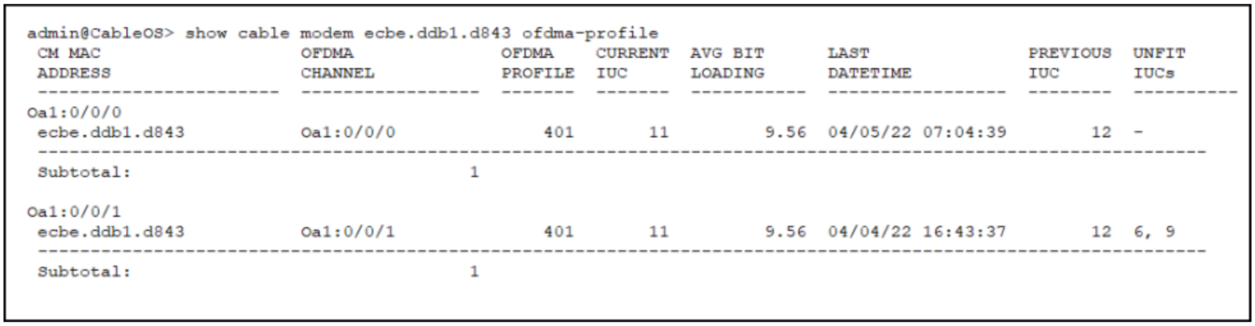
Usage guidelines

The information is taken from the history table in the database (cable_modem_ofdma_hoping_history). This table saves the history (latest 10 updates) of each cable modem.

You cannot select a MAC address or IP address if you are using the `total` option.

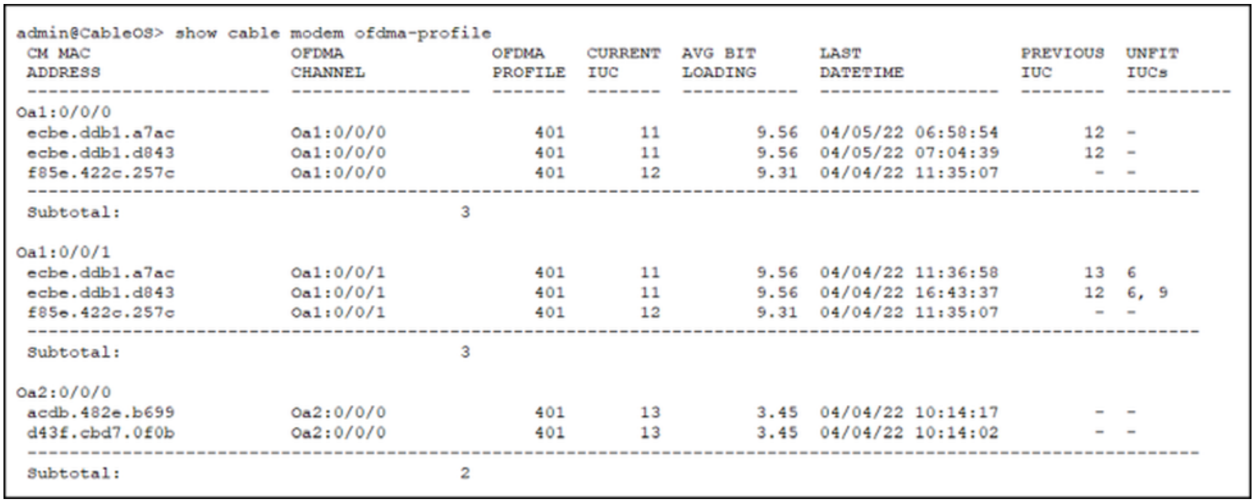
Examples

The following example displays the output for a specific MAC address:



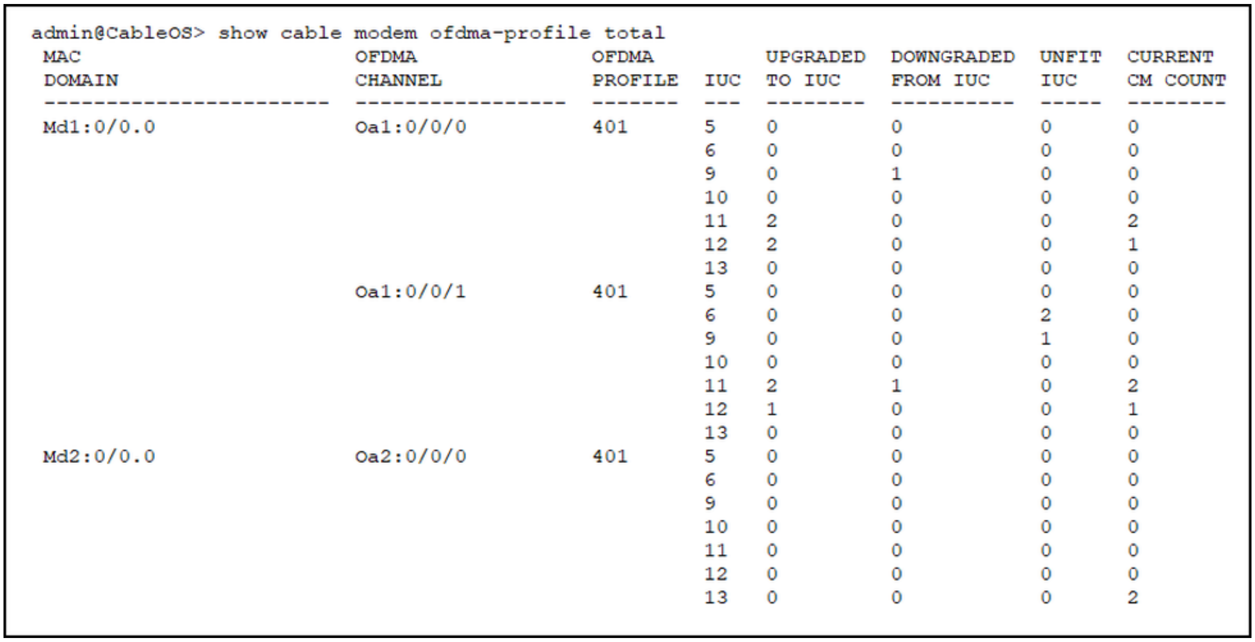
```
admin@CableOS> show cable modem ecbe.ddb1.d843 ofdma-profile
 CM MAC                   OFDMA              OFDMA    CURRENT  AVG BIT      LAST               PREVIOUS  UNFIT
 ADDRESS                  CHANNEL            PROFILE  IUC      LOADING      DATETIME           IUC       IUCs
 -----------------------  -----------------  -------  -------  -----------  -----------------  --------  ----------
Oa1:0/0/0
 ecbe.ddb1.d843           Oa1:0/0/0              401       11         9.56  04/05/22 07:04:39        12  -
 ---------------------------------------------------------------------------------------------------------------
 Subtotal:                                1

Oa1:0/0/1
 ecbe.ddb1.d843           Oa1:0/0/1              401       11         9.56  04/04/22 16:43:37        12  6, 9
 ---------------------------------------------------------------------------------------------------------------
 Subtotal:                                1
```

The following example displays the output for all OFDMA channels:



```
admin@CableOS> show cable modem ofdma-profile
 CM MAC                         OFDMA                  OFDMA      CURRENT    AVG BIT         LAST                   PREVIOUS    UNFIT
 ADDRESS                        CHANNEL                PROFILE    IUC        LOADING         DATETIME               IUC         IUCs
 ---------------------------    --------------------   --------   --------   ------------    --------------------   ---------   -----------
Oa1:0/0/0
 ecbe.ddb1.a7ac                 Oa1:0/0/0                   401         11           9.56    04/05/22 06:58:54             12   -
 ecbe.ddb1.d843                 Oa1:0/0/0                   401         11           9.56    04/05/22 07:04:39             12   -
 f85e.422c.257c                 Oa1:0/0/0                   401         12           9.31    04/04/22 11:35:07              -   -
 -------------------------------------------------------------------------------------------------------------------------------
 Subtotal:                                        3

Oa1:0/0/1
 ecbe.ddb1.a7ac                 Oa1:0/0/1                   401         11           9.56    04/04/22 11:36:58             13   6
 ecbe.ddb1.d843                 Oa1:0/0/1                   401         11           9.56    04/04/22 16:43:37             12   6, 9
 f85e.422c.257c                 Oa1:0/0/1                   401         12           9.31    04/04/22 11:35:07              -   -
 -------------------------------------------------------------------------------------------------------------------------------
 Subtotal:                                        3

Oa2:0/0/0
 acdb.482e.b699                 Oa2:0/0/0                   401         13           3.45    04/04/22 10:14:17              -   -
 d43f.cbd7.0f0b                 Oa2:0/0/0                   401         13           3.45    04/04/22 10:14:02              -   -
 -------------------------------------------------------------------------------------------------------------------------------
 Subtotal:                                        2
```

The following example shows the total information for each OFDMA profile:



```
admin@CableOS> show cable modem ofdma-profile total
 MAC                        OFDMA                 OFDMA           UPGRADED   DOWNGRADED   UNFIT   CURRENT
 DOMAIN                     CHANNEL               PROFILE   IUC   TO IUC     FROM IUC     IUC     CM COUNT
 -----------------------    -----------------     -------   ---   --------   ----------   -----   --------
 Md1:0/0.0                  Oa1:0/0/0             401       5     0          0            0       0
                                                            6     0          0            0       0
                                                            9     0          1            0       0
                                                            10    0          0            0       0
                                                            11    2          0            0       2
                                                            12    2          0            0       1
                                                            13    0          0            0       0
                            Oa1:0/0/1             401       5     0          0            0       0
                                                            6     0          0            2       0
                                                            9     0          0            1       0
                                                            10    0          0            0       0
                                                            11    2          1            0       2
                                                            12    1          0            0       1
                                                            13    0          0            0       0
 Md2:0/0.0                  Oa2:0/0/0             401       5     0          0            0       0
                                                            6     0          0            0       0
                                                            9     0          0            0       0
                                                            10    0          0            0       0
                                                            11    0          0            0       0
                                                            12    0          0            0       0
                                                            13    0          0            0       2
```

Output columns - Details

Field	**Description**
MAC Domain	The MAC domain for this CM
CM MAC Address	The MAC address of this CM
OFDMA CHANNEL	Specifies the OFDMA channel: Chassis/Card/Port
OFDMA PROFILE	The modulation profile used by the OFDMA channel
CURRENT IUC	The current IUC being used by the OFDMA channel
AVG BIT LOADING	The average bit loading of the IUC

Field	Description
LAST DATETIME	The date and time of the last update of the OFDMA profile
PREVIOUS IUC	The previous IUC used by the OFDMA channel
UNFIT IUCs	A list of all the unfit IUCs in this channel

Output columns - Totals

Field	Description
MAC Domain	The MAC domain of the OFDMA channel
OFDMA CHANNEL	Specifies the OFDMA channel: Chassis/Card/Port
OFDMA PROFILE	The modulation profile used by the OFDMA channel
IUC	The configured IUC
UPGRADED TO IUC	The number of times the IUC was upgraded to this specific IUC
DOWNGRADED FROM IUC	The number of times the IUC was downgraded from this specific IUC
UNFIT IUCs	The number of cable modems for which this IUC is unfit
CURRENT CM COUNT	The number of cable modems currently using this IUC for the specific OFDMA channel

show cable modem offline

Use the `show cable modem offline` command to show a list of the cable modems that are marked as offline.

`show cable modem offline` { *single-cm* }

To display cable modems that are considered offline, enter the following command:

`show cable modem offline` { *cable-interfaces* }

Syntax description

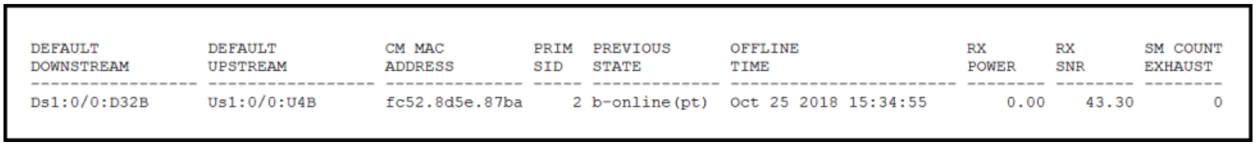
single-cm	Selects a CM.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.

Command mode

Exec mode.

Examples

The following example shows an offline cable modem:



```
DEFAULT           DEFAULT           CM MAC         PRIM  PREVIOUS      OFFLINE                 RX       RX       SM COUNT
DOWNSTREAM        UPSTREAM          ADDRESS        SID   STATE         TIME                    POWER    SNR      EXHAUST
----------------- ----------------- -------------- ----- ------------- ----------------------- -------- -------- --------
Ds1:0/0:D32B      Us1:0/0:U4B       fc52.8d5e.87ba     2 b-online(pt)  Oct 25 2018 15:34:55        0.00    43.30        0
```

show cable modem partial-mode

Use the `show cable modem partial-mode` command to show a list of cable modems that are in upstream and downstream partial mode.

`show cable modem partial-mode` { *single-cm* | *cable-interfaces* }

Syntax description

single-cm	Selects a CM.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.

Command mode

Exec mode.

Usage guidelines

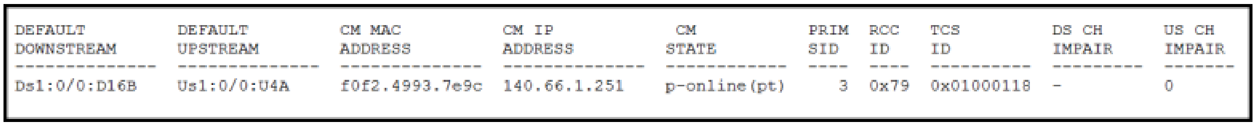
If all cable modems are in full service mode (all downstream and upstream channels of the cable modems are online and operational), then the `show cable modem partial-mode` command does not provide any output. This command provides output only when the cable modems register in partial service mode (one or more downstream or upstream channels of the downstream or upstream bonded cable modems are not operational).

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example shows a partial mode cable modem:



```
DEFAULT         DEFAULT         CM MAC          CM IP            CM           PRIM RCC  TCS         DS CH     US CH
DOWNSTREAM      UPSTREAM        ADDRESS         ADDRESS         STATE         SID  ID   ID          IMPAIR    IMPAIR
--------------  --------------  --------------  --------------  ------------  ---- ---- ----------  --------- -------
Ds1:0/0:D16B    Us1:0/0:U4A     f0f2.4993.7e9c  140.66.1.251    p-online(pt)     3 0x79 0x01000118  -         0
```

Output columns

Field	**Description**
CM MAC Address	CM Ethernet MAC address
I/F	Cable Interface
RCC ID	Receive channel configuration (RCC) ID of the cable modem
TCS ID	Transmit Channel Set ID for the CM
DS CH IMPAIR	List of downstream channels impaired, with “+” in last column of the field if the list does not fit. Run `show cable modem verbose` to get the full list of impaired channels in this case.
US CH IMPAIR	List of upstream channels impaired, with “+” in last column of the field if the list does not fit. Run `show cable modem verbose` to get the full list of impaired channels in this case.

show cable modem phy

Use the `show cable modem phy` command, to display the DOCSIS PHY layer information for one or more cable modems.

`show cable modem` [{ *ip-address mac-address* | `cable` | { *slot* / *subslot* / *port* } | { *slot* / *subslot* / *cable-interface-index* } [| `upstream` *port [logical-channel-index]*] | `name` *fqdn* } `phy`

Syntax description

ip-address	(Optional) IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.
mac-address	(Optional) MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.
slot	The valid range is from 5 to 8.
subslot	Secondary slot number of the cable interface line card. The valid subslots are 0 or 1.
port	The valid range is from 0 to 4 (depending on the cable interface).

cable-interface-index	Either the downstream port number or the MAC domain index of the RPD.
`upstream port`	(Optional) Displays information for all CMs using the specified upstream port. You can specify this option only when displaying information for a cable interface. The valid range for the port begins with 0 and ends with a value that depends on the number of upstream ports supported by the cable interface line card.
logical-channel-index	(Optional) Logical channel index. The valid values are 0 or 1.
`name` *fqdn*	(Optional) Specifies the fully qualified domain name (FQDN) of the cable device to be displayed. This option is only available if the `show cable modem domain-name` command has been run for the first time to update the cable DNS cache on the CMTS router.
`phy`	Displays DOCSIS PHY layer information for one or more cable modems.

Command mode

Exec mode.

Usage guidelines

This command displays information about the DOCSIS PHY layer for one or more CMs. You can display information for all CMs, for all CMs on a particular cable interface, or for a particular CM, as identified by its IP or MAC address.

Operation with Hot Standby Connection-to-Connection Protocol (HCCP) Configuration

If you are using Hot Standby Connection-to-Connection Protocol (HCCP) 1+1 or 1:n (N+1) redundancy, the new primary processor after a switchover automatically creates a new database of the online cable modems. This means that the `show cable modem ip-address` command might not show a particular cable modem until the CMTS receives IP traffic from that cable modem. You can force IP traffic by using the `ping ip-address` command, and then the `show cable modem ip-address` command will show the cable modem. You can also display any particular cable modem by using the `show cable modem | include ip-address` command.

In addition, when HCCP redundancy has been configured, the IOS software automatically synchronizes the secondary, backup cards whenever the configuration is changed. The cards can also be synchronized manually, using the `hccp resync` command. When a SYNC event command occurs, CLI commands might be very slow to respond. In particular, if you enter the `show cable modem` command at the same time a SYNC event is occurring, the command might produce a blank display, or it might display an error message similar to the following:

```
%No response from slot 6/1. Command aborted
```

If this occurs, wait a minute or so and retry the command.

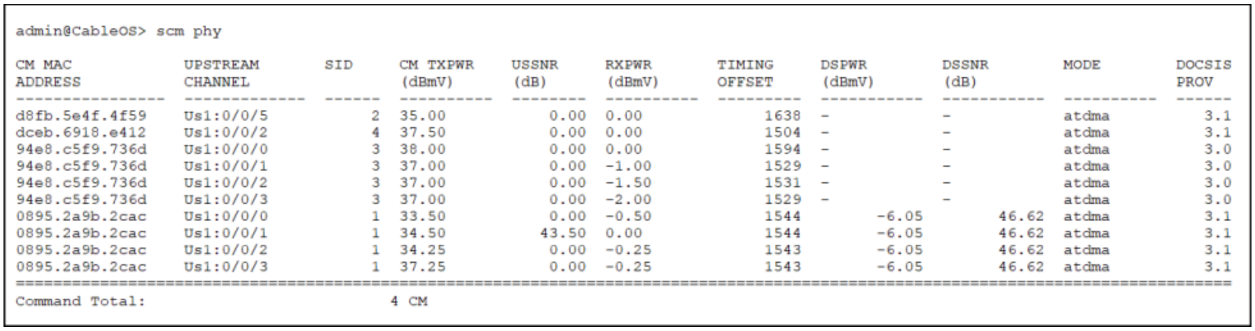
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ----------------------------------------------------------------------------
 x
```

Examples

The following example displays information about the DOCSIS PHY layer for one or more CMs:

```
show cable modem phy
```



```
admin@CableOS> scm phy

CM MAC            UPSTREAM       SID     CM TXPWR    USSNR     RXPWR       TIMING     DSPWR        DSSNR        MODE        DOCSIS
ADDRESS           CHANNEL                (dBmV)      (dB)      (dBmV)      OFFSET     (dBmV)       (dB)                     PROV
----------------  -------------  ------  ----------  --------  ----------  ---------  -----------  -----------  ----------  ------
d8fb.5e4f.4f59    Us1:0/0/5           2  35.00           0.00  0.00             1638  -            -            atdma          3.1
dceb.6918.e412    Us1:0/0/2           4  37.50           0.00  0.00             1504  -            -            atdma          3.1
94e8.c5f9.736d    Us1:0/0/0           3  38.00           0.00  0.00             1594  -            -            atdma          3.0
94e8.c5f9.736d    Us1:0/0/1           3  37.00           0.00  -1.00            1529  -            -            atdma          3.0
94e8.c5f9.736d    Us1:0/0/2           3  37.00           0.00  -1.50            1531  -            -            atdma          3.0
94e8.c5f9.736d    Us1:0/0/3           3  37.00           0.00  -2.00            1529  -            -            atdma          3.0
0895.2a9b.2cac    Us1:0/0/0           1  33.50           0.00  -0.50            1544        -6.05        46.62  atdma          3.1
0895.2a9b.2cac    Us1:0/0/1           1  34.50          43.50  0.00             1544        -6.05        46.62  atdma          3.1
0895.2a9b.2cac    Us1:0/0/2           1  34.25           0.00  -0.25            1543        -6.05        46.62  atdma          3.1
0895.2a9b.2cac    Us1:0/0/3           1  37.25           0.00  -0.25            1543        -6.05        46.62  atdma          3.1
==================================================================================================================================
Command Total:                          4 CM
```

Output columns

Field	Description
CM MAC Address	CM Ethernet MAC address
Port	Port of the modem
SID	Service ID that for this CM
USPwr (dBmV)	Displays the CM transmit level in dBmV, as measured by the CMTS
USSNR (dBmV)	Upstream signal-to-noise ratio (SNR) or carrier-to-noise ratio (CNR), in dB, as measured by the CMTS. This field displays the CNR value for cable interfaces that support on-board hardware-based spectrum management, and shows the SNR value for other cable interfaces.
Timing Offset	The timing offset for the CM, in ticks, as recognized on the CMTS. (A tick, as used here, is 6.25/64 microseconds.) This is the delay between when a particular cable modem is scheduled to make a transmission and when the CMTS actually receives it.

Field	Description
Microreflec (dBc)	The approximate value of micro-reflections on the downstream, measured in dBc below the signal level, as seen by the CM. Micro-reflections are a type of impairment caused by impedance mismatches between amplifiers, couples, cables, and other equipment in the cable plant. Micro-reflections create copies of a signal that arrive at the receiver with different amounts of delay and attenuation, generating inter-symbol interference (ISI) that can cause the receiver to improperly detect the amplitude and phase of the incoming signal.
DSPwr (dBmV)	The downstream receive power level, in dBmV, as reported by the CM
DSSNR (dBmV)	The downstream signal-to-noise ratio (SNR), in dB, as reported by the CM
Mode	DOCSIS operating mode for the CM: • tdma=DOCSIS 1.X, TDMA-only mode • atdma=DOCSIS 2.0 A-TDMA mode

NOTE: A value of **-** in any field indicates that the request for information timed out.

show cable modem primary-channel

To display primary channel information for multiple CMs, use the `show cable modem primary-channel` command.

```
show cable modem [ cable-interfaces ] primary-channel [ select multiple-cm ] [
total ]
```

Syntax description

`Cable-interfaces`	(Optional) Selects CMs operating on one or more cable interfaces.
`select multiple-cm`	(Optional) Selects a subset of the CMs operating on cable-interfaces as described in *Cable modem selection*.
`total`	If “total” is specified, the CableOS Core omits the column headers and displays only the “Total” lines for md-or-port wildcard expansions (if any) and the “Command Total” line at the end.

Command mode

Exec mode.

Usage guidelines

The CableOS Core groups the output lines by MAC domain and displays them in order of the MAC domain ifName “mdU/N”. If md-or-port is specified for upstream ports (“usnn:ss/pp”), the CMs are then ordered by Upstream Channel Set; otherwise they are ordered by Downstream Channel Set. Within each channel set, CMs are displayed in order of their CM MAC address.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example will display information for each CM separately:

```
show cable modem primary-channel
```

Output columns

Field	Description
Default Downstream	For modems not operating with downstream bonding, this field shows the primary downstream channel in the form DsSS/P/CCC for 80G12 slot SS, 80G12 port P, and down-channel CCC. For modems operating with downstream bonding, the Downstream column identifies a downstream bonding group of the default downstream service flow with DsSS/P:DDDD where SS is a 80G12 slot, P is a 80G12 port, and DDDD is a port-level downstream bonding group name. The CableOS Core assigns a single downstream bonding group to downstream bonded CMs.
Default Upstream	For modems not operating with upstream bonding, this column shows the upstream logical channel in the form UsSS/P/C/L for 80G12 slot SS, 80G12 port P, us-phy-channel C, and us-logical-channel L. For modems operating with upstream bonding, the Upstream column identifies an Upstream bonding group with DsSS/P:UUU where SS is a 80G12 slot, P is a 80G12 port, and UUU is the port-level upstream bonding group name.
CM MAC Address	The Ethernet MAC address of the cable modem
CM State	The state of the CM on its MAC domain. See the CM State descriptions for `show cable modem`
PRIM SID	The primary SID that identifies a cable modem
DUM SID	The number of CPE IP addresses reachable through the CM as learned by snooping DHCP
Primary DS Channel	The primary downstream channel of the CM

Related information

show cable modem

show cable modem bonding

show cable modem connectivity
show cable modem counters
show cable modem cpe
show cable modem ipv6
show cable modem ofdm-profile
show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem privacy

Use the `show cable modem privacy` command to display the privacy information for the registered and unregistered CMs.

`show cable modem` *<cm-selection>* `privacy` [`verbose`]

Syntax description

cm-selection	Selects a single CM, as described in *Cable modem selection*.
`verbose`	Specify verbose to show additional information about BPI.

Command mode

Exec mode.

Usage guidelines

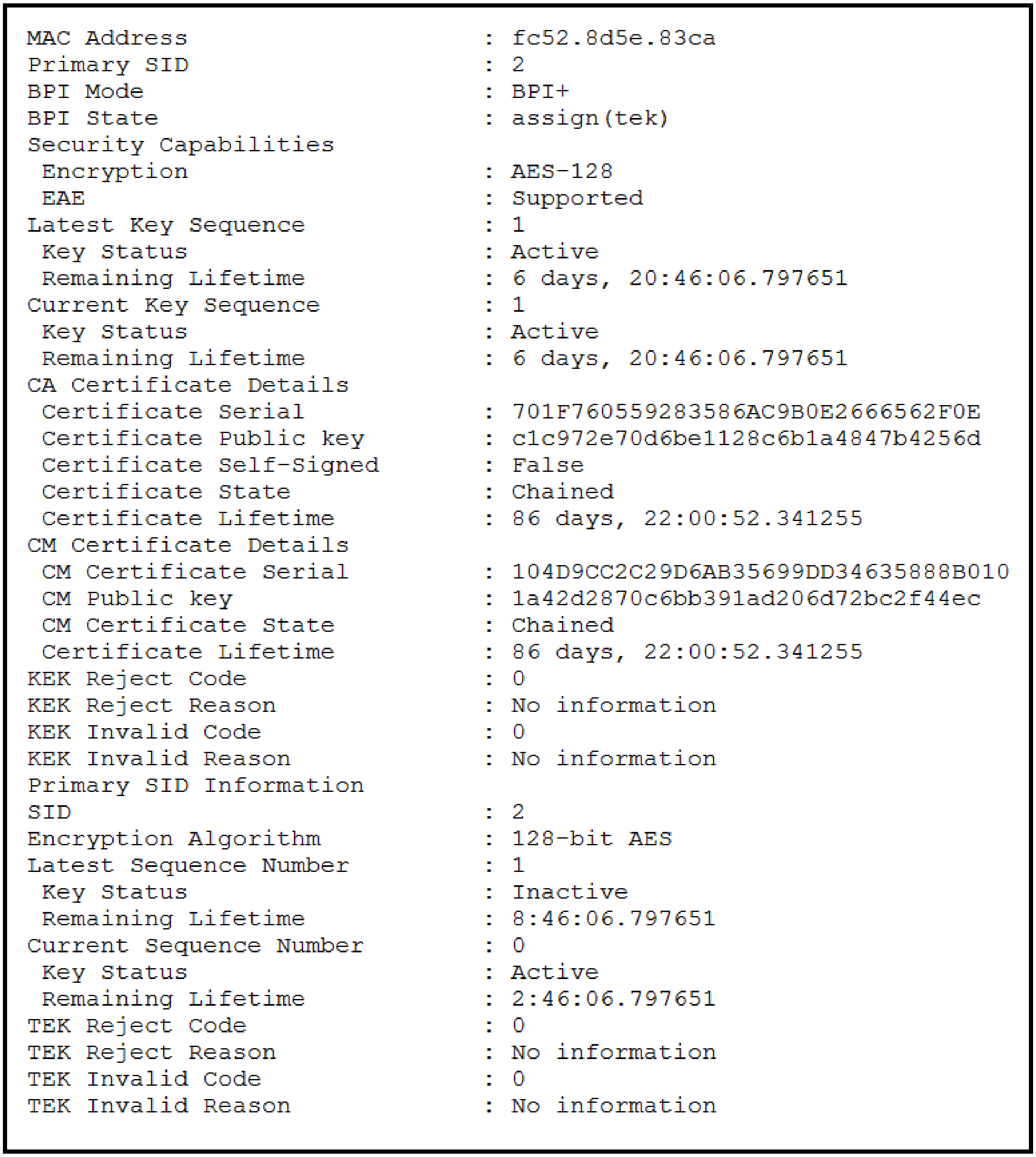
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example displays privacy information about the CM at the given MAC address:

```
show cable modem fc52.8d5e.83ca privacy
```



```
MAC Address                    : fc52.8d5e.83ca
Primary SID                    : 2
BPI Mode                       : BPI+
BPI State                      : assign(tek)
Security Capabilities
 Encryption                    : AES-128
 EAE                           : Supported
Latest Key Sequence            : 1
 Key Status                    : Active
 Remaining Lifetime            : 6 days, 20:46:06.797651
Current Key Sequence           : 1
 Key Status                    : Active
 Remaining Lifetime            : 6 days, 20:46:06.797651
CA Certificate Details
 Certificate Serial            : 701F760559283586AC9B0E2666562F0E
 Certificate Public key        : c1c972e70d6be1128c6b1a4847b4256d
 Certificate Self-Signed       : False
 Certificate State             : Chained
 Certificate Lifetime          : 86 days, 22:00:52.341255
CM Certificate Details
 CM Certificate Serial         : 104D9CC2C29D6AB35699DD34635888B010
 CM Public key                 : 1a42d2870c6bb391ad206d72bc2f44ec
 CM Certificate State          : Chained
 Certificate Lifetime          : 86 days, 22:00:52.341255
KEK Reject Code                : 0
KEK Reject Reason              : No information
KEK Invalid Code               : 0
KEK Invalid Reason             : No information
Primary SID Information
SID                            : 2
Encryption Algorithm           : 128-bit AES
Latest Sequence Number         : 1
 Key Status                    : Inactive
 Remaining Lifetime            : 8:46:06.797651
Current Sequence Number        : 0
 Key Status                    : Active
 Remaining Lifetime            : 2:46:06.797651
TEK Reject Code                : 0
TEK Reject Reason              : No information
TEK Invalid Code               : 0
TEK Invalid Reason             : No information
```

Output columns

Field	Description
MAC Address	MAC address for the CM
Prim SID	Primary SID assigned to the CM
BPI Mode	Baseline Privacy Interface (BPI) mode used

Field	**Description**
BPI State	Displays the BPI state
Security Capabilities	Security capabilities of the modem-like encryption algorithm and Early Authentication and Encryption (EAE)
Encryption	Encryption method used
EAE	EAE support
Latest Key Sequence	Latest key sequence number
Remaining Lifetime	Remaining lifetime of the key in seconds
Authorization Key	Authorization key code
Key Encryption Key	Key used to encrypt the traffic key
Upstream HMAC Key	Upstream Hashed Message Authentication Code (HMAC) key
Downstream HMAC Key	Downstream Hashed Message Authentication Code (HMAC) key
Current Key Sequence	Current key sequence number
Authorization Counters	Authorization counter information
Authorization Infos	Authorization information
Authorization Requests	Number of authorized requests
Authorization Replies	Number of authorized replies
Authorization Rejects	Rejected authorization
Authorization Invalids	Invalid authorization
Traffic Key Counters	Traffic key counter information
Traffic Key Requests	Number of traffic key requests
Traffic Key Replies	Number of traffic key replies
Traffic Key Rejects	Number of traffic key rejects
Traffic Key Invalids	Number of invalid traffic keys
Certificate Counters	Certificate counter information
Untrusted Manufacturer	Count of untrusted manufacturers
Untrusted Cable Modem Certificate	Count of untrusted cable modem certificates
Issuer Not Found	Count of certificate issuers not found in the database
Invalid Signature	Count of invalid signatures

Field	Description
Expired Certificate	Number of expired certificates
Certificate Not Activated	Count of certificates not activated
Certificate in Hotlist	Number of certificates in hotlist
Public Key Mismatch	Number of public key mismatch
Invalid MAC	Number of invalid MACs
Invalid Cable Modem Certificate	Number of invalid cable modem certificates
Other issues	Number of certificates with other issues
CA Certificate Details	CA certificate information
Certificate Serial	CA certificate serial number
Certificate Self-Signed	Self-signed CA certificate
Certificate State	Current state of the CA certificate
Certificate Error Code	CA certificate verification error code
Certificate Error Reason	CA certificate verification error reason
KEK Reject Code	Key Encryption Key (KEK) reject code
KEK Reject Reason	KEK reject reason
KEK Invalid Code	KEK invalid code
KEK Invalid Reason	Reason for the invalid KEK
Primary SID Information	Primary SID assigned to this CM
SID	SID used by the CM
Encryption Algorithm	Encryption algorithm used
Latest Sequence Number	Latest sequence number
Current Sequence Number	Current sequence number
DES Key	Data Encryption Standard (DES) key number
DES IV	Initialization vector. This can be AES or DES
TEK Requests	Displays the number of Traffic Exchange Key (TEK) requests
TEK Replies	Number of TEK replies
TEK Rejects	Number of TEK rejects

Field	Description
TEK Invalids	Number of invalid TEKs
TEK Receive Errors	Number of TEK receive errors
TEK Reject Code	TEK reject code
TEK Reject Reason	TEK reject reason
TEK Invalid Code	TEK invalid code
TEK Invalid Reason	TEK invalid reason

Related information

show cable modem
show cable modem bonding
show cable modem connectivity
show cable modem counters
show cable modem cpe
show cable modem ipv6
show cable modem primary-channel
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem qos

Use the `show cable modem qos` command to display the Quality of Service (QoS) and service flow information for a specific cable modem.

`show cable modem` { *ip-address* | *mac-address* } `qos` [{ *service-class* | *verbose* | *bps* }]

ip-address	IPv4 or IPv6 address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.
mac-address	MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM is displayed.
service-class	(Optional) Displays the service class names associated with each service flow for a specific cable modem.
verbose	(Optional) Displays detailed information for each service flow ID (SFID) for the CM.
bps	(Optional) the same as without the optional fields, but reports throughput in bits per second (bps) instead of packets per second (pps).

Command mode

Exec mode.

Usage guidelines

This command displays the service flows currently in use by a CM. The default form of the display shows one service flow per line, while the verbose keyword displays complete information for each flow.

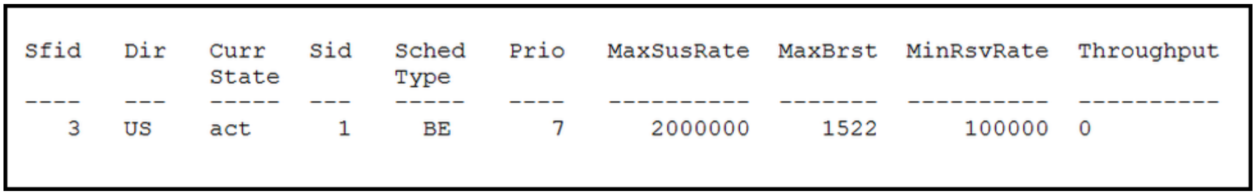
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Example

The following example is a sample output of the `show cable modem qos` command for a specific CM identified by its MAC address:

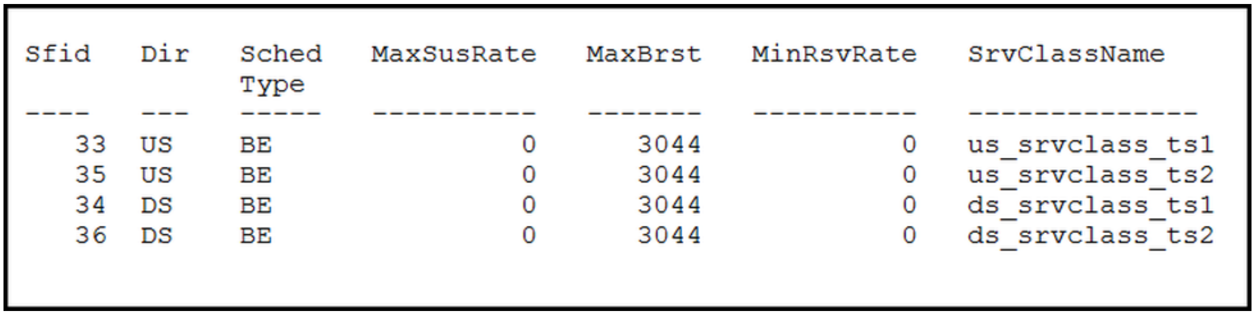
```
show cable modem 0010.7bb3.fcd1 qos
```



```
Sfid   Dir   Curr   Sid   Sched   Prio   MaxSusRate   MaxBrst   MinRsvRate   Throughput
             State        Type
----   ---   -----  ---   -----   ----   ----------   -------   ----------   ----------
   3   US    act      1    BE        7      2000000      1522       100000   0
```

The following example is a sample output of the `service-class` option of the `show cable modem qos` command for a specific CM identified by its IP address:

```
show cable modem 22.1.1.10 qos service-class
```



```
Sfid   Dir   Sched   MaxSusRate   MaxBrst   MinRsvRate   SrvClassName
             Type
----   ---   -----   ----------   -------   ----------   ---------------
  33   US    BE               0      3044            0   us_srvclass_ts1
  35   US    BE               0      3044            0   us_srvclass_ts2
  34   DS    BE               0      3044            0   ds_srvclass_ts1
  36   DS    BE               0      3044            0   ds_srvclass_ts2
```

Output columns

Field	Description
Fid	Identifies the Flow ID (FID) for this service flow
Dir	Identifies whether the service flow applies to the downstream (DS) or upstream (US) direction
CUR STATE	Current State - Identifies the current state of the service flow: Active or Inactive
SID	Identifies the Service ID (SID) associated with this FID
SCHED TYPE	Identifies this service flow’s scheduling type: • BE - Best-Effort • NRTPS - Non-Real-Time Polling Service • N/A - Scheduling type is not applicable to a service flow • RTPS - Real-Time Polling Service • RSVD - Reserved but not yet in use • UGS_AD - Unsolicited Grant Service with Activity Detection • UGS - Unsolicited Grant Service • UNDEF - Not yet defined
PRIO	Traffic priority (0 to 7) given to this service flow
MAX-SUS RATE	Maximum sustained rate value, in bits per second
MAX BRST	Maximum burst value, in bytes
MIN-RSV RATE	Minimum reserved rate, in bits per second
THROUGHPUT	Current Throughput for this service flow, in packets per second. **NOTE:** If key **bps** was used, the Throughput will be reported in bits per second
SrvClassName	The service class name associated with this service flow
Minimum Packet Size	Assured minimum reserved rate packet size on this service flow, in bytes
Admitted QoS Timeout	Timeout for admitted QoS parameters, in seconds, which specifies the length of time that the CMTS must reserve resources for a service flow’s admitted QoS parameter set, when they exceed the resources allowed by the active QoS parameter set
Maximum Latency	Maximum downstream latency allowed for packets using this service flow, in microseconds
Active QoS Timeout	Timeout for active QoS parameters, in seconds, which specifies the maximum amount of time that resources can remained unused on an active service flow

Related information

show cable modem

show cable modem bonding

show cable modem connectivity

show cable modem counters

show cable modem cpe
show cable modem ipv6
show cable modem ofdm-profile
show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem registered

Use the `show cable modem registered` command to show a list of cable modems that have registered with the CMTS.

`show cable modem registered {` *single-cm* `}`
`show cable modem registered {` *cable-interfaces* `}`

Syntax description

single-cm	Selects a CM.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.

Command mode

Exec mode.

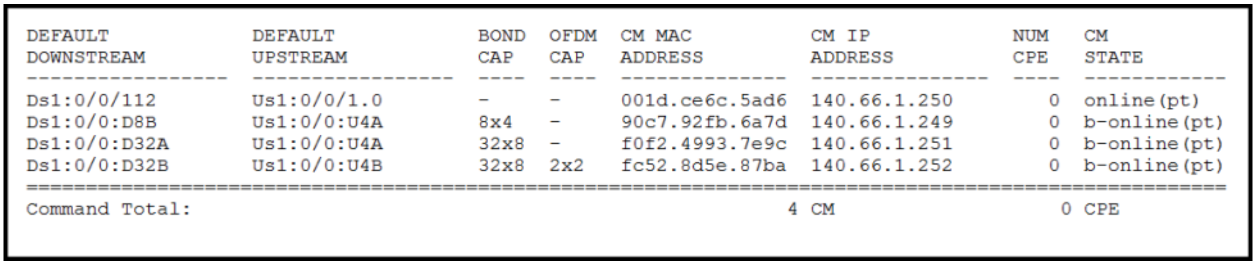
Usage guidelines

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example shows a list of registered cable modems:



```
DEFAULT            DEFAULT            BOND  OFDM  CM MAC          CM IP            NUM   CM
DOWNSTREAM         UPSTREAM           CAP   CAP   ADDRESS         ADDRESS          CPE   STATE
-----------------  -----------------  ----  ----  --------------  ---------------  ----  ------------
Ds1:0/0/112        Us1:0/0/1.0        -     -     001d.ce6c.5ad6  140.66.1.250        0  online(pt)
Ds1:0/0:D8B        Us1:0/0:U4A        8x4   -     90c7.92fb.6a7d  140.66.1.249        0  b-online(pt)
Ds1:0/0:D32A       Us1:0/0:U4A        32x8  -     f0f2.4993.7e9c  140.66.1.251        0  b-online(pt)
Ds1:0/0:D32B       Us1:0/0:U4B        32x8  2x2   fc52.8d5e.87ba  140.66.1.252        0  b-online(pt)
=====================================================================================================
Command Total:                                                  4 CM                   0 CPE
```

Related information

show cable modem unregistered

show cable modem remote-query

Use the `show cable modem remote-query` command to display the polled RF parameters for each cable modem registered on the Core.

`show cable modem remote-query`

Syntax description

This command has no arguments or keywords.

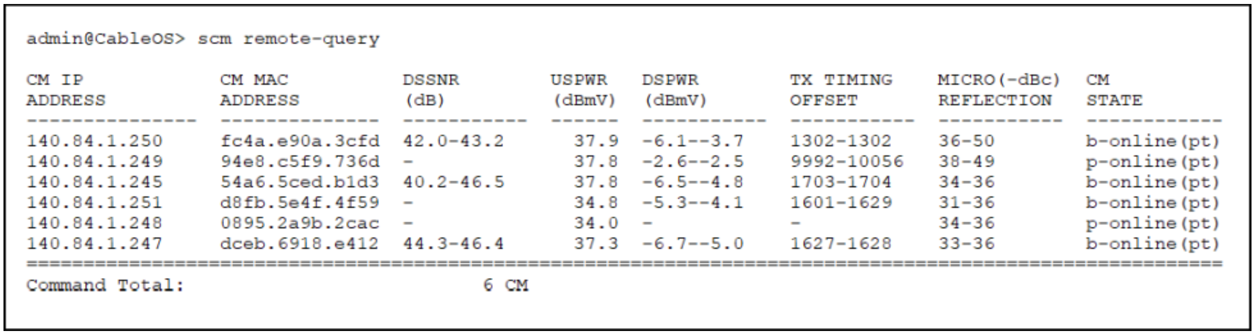
Command mode

Exec mode.

Example

The following example is sample output of the `show cable modem remote-query` command:

```
show cable modem remote-query
```



```
admin@CableOS> scm remote-query

CM IP            CM MAC          DSSNR        USPWR   DSPWR        TX TIMING    MICRO(-dBc)  CM
ADDRESS          ADDRESS         (dB)         (dBmV)  (dBmV)       OFFSET       REFLECTION   STATE
---------------  --------------  -----------  ------  -----------  -----------  -----------  ------------
140.84.1.250     fc4a.e90a.3cfd  42.0-43.2      37.9  -6.1--3.7    1302-1302    36-50        b-online(pt)
140.84.1.249     94e8.c5f9.736d  -              37.8  -2.6--2.5    9992-10056   38-49        p-online(pt)
140.84.1.245     54a6.5ced.b1d3  40.2-46.5      37.8  -6.5--4.8    1703-1704    34-36        b-online(pt)
140.84.1.251     d8fb.5e4f.4f59  -              34.8  -5.3--4.1    1601-1629    31-36        b-online(pt)
140.84.1.248     0895.2a9b.2cac  -              34.0  -            -            34-36        p-online(pt)
140.84.1.247     dceb.6918.e412  44.3-46.4      37.3  -6.7--5.0    1627-1628    33-36        b-online(pt)
=========================================================================================================
Command Total:                          6 CM
```

Output columns

Field	Description
CM MAC Address	The MAC address of the CM
CM IP Address	The IP address of the CM
DSSNR(dB)	The downstream signal-to-noise ratio (SNR), in dB, as reported by the CM
USPWR (dBmV)	Displays the CM transmit level, in dBmV, as measured by the CMTS
DSPWR (dBmV)	The downstream receive power level, in dBmV, as reported by the CM
TX TIMINGOFFSET	The timing offset for the CM, in ticks, as recognized on the CM. This is the delay between when a particular cable modem is scheduled to make a transmission and when the CMTS actually receives it. The CM value includes any internal delay between when the CM software begins the transmission and when the bits actually appear on the local cable interface. **NOTE:** The timing offset shown here is typically larger than the Time Offset value shown by the `show cable modem` command, because the latter value is the offset as recognized on the CMTS (which does not include the internal delay on the CM).
MICRO (-dBc) REFLECTION	The approximate number of total microreflections (including in-channel responses) on the downstream, measured in dBc below the signal level, as seen by the CM. Microreflections are a type of impairment that is caused by impedance mismatches between amplifiers, couples, cables, and other equipment in the cable plant. Microreflections create copies of a signal that arrive at the receiver with different amounts of delay and attenuation, generating inter-symbol interference (ISI) that can cause the receiver to improperly detect the amplitude and phase of the incoming signal. **NOTE:** This value is not exact but provides an approximate indication of the microreflections that have been received.
CM STATE	The current state of the MAC layer for the CM

NOTE: A value of **-** in any field indicates that the request for information timed out.

Related information

cable modem remote-query

show cable modem ripv2

Use the `show cable modem ripv2` command to show a list of cable modems that use RIPv2.

`show cable modem ripv2 {` *single-cm* `}`

To display cable modems that use RIPv2, enter the following command:

`show cable modem ripv2 {` *cable-interfaces* `}`

Syntax description

single-cm	Selects a CM.
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.

Command mode

Exec mode.

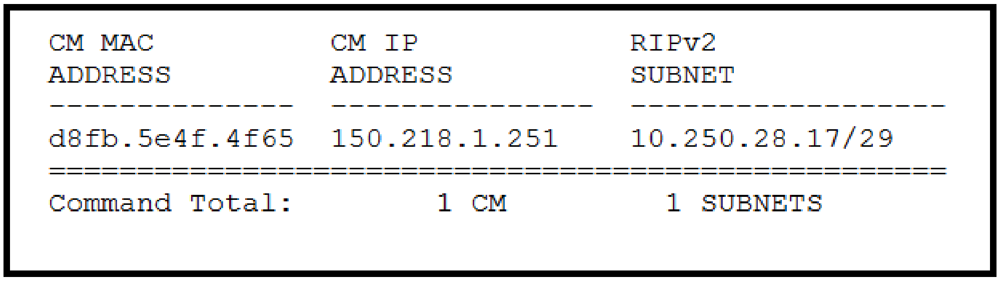
Usage guidelines

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example shows a list of cable modems that use RIPv2:



```
CM MAC           CM IP             RIPv2
ADDRESS          ADDRESS           SUBNET
--------------   ---------------   ------------------
d8fb.5e4f.4f65   150.218.1.251     10.250.28.17/29
===================================================
Command Total:         1 CM          1 SUBNETS
```

Related information

cable rip allow-subnet

show cable modem rogue

Use the `show cable modem rogue` command to display the list of cable modems that have been marked as locked or rejected because they failed the Dynamic Shared Secret authentication checks.

Syntax description

This command has no arguments or keywords.

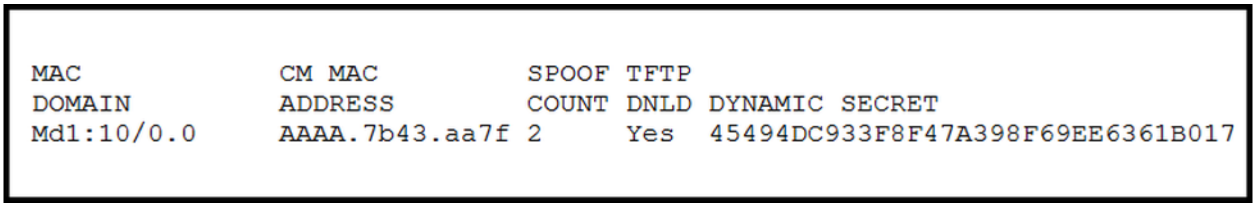
Command mode

Exec mode.

Examples

The following example displays the list of locked and rejected modems:

```
show cable modem rogue
```



```
MAC             CM MAC          SPOOF TFTP
DOMAIN          ADDRESS         COUNT DNLD DYNAMIC SECRET
Md1:10/0.0      AAAA.7b43.aa7f 2      Yes  45494DC933F8F47A398F69EE6361B017
```

show cable modem select

To use the show command on a specific subset of CMs, use the `show cable modem select` command.

`show cable modem` <*cm-selection*> `select` <*cm-filter*>

Syntax description

cm-selection	Selects a subset of the CMs operating on cable-interfaces.
cm-filter	Defines a filter for which CMs within the selection you wish to display.

Command mode

Exec mode.

Usage guidelines

The CableOS Core groups the output lines by MAC domain and displays them in order of the MAC domain ifName “mdU/N”. If md-or-port is specified for upstream ports (“usnn:ss/pp”), the CMs are then ordered by Upstream Channel Set; otherwise they are ordered by Downstream Channel Set. Within each channel set, CMs are displayed in order of their CM MAC address.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example will display all information about the CM at the given IPv6 address:

```
show cable modem 001d.ce66.c124 verbose
```

Output columns

Field	Description
Default downstream	Indicates the assigned downstream channel or bonding group for the default downstream service flow of the CM
Default upstream	Indicates the channel or upstream bonding group assigned to the CM’s default upstream service flow
Bond cap	The “Bonding Capability” of the CM. When a CM registers with an advertised Multiple Receive Channel (MRC) capability of D channels and/or a Multiple Transmit Channel (MTC) capability of U channels, the CableOS Core reports the “BOND CAP” bonding capability of the CM as DxU. If the CM is not registered, or is a pre-DOCSIS 3.0 CM that registered with neither MTC nor MRC capability, the CableOS Core reports no (or unknown) bonding capability with a hyphen “-“.
CM MAC Address	CM Ethernet MAC address
CM IP Address	CM IPv4 address in dotted decimal notation
CM State	Displays CM state

Related information

show cable modem

show cable modem bonding

show cable modem connectivity

show cable modem counters

show cable modem cpe

show cable modem ipv6

show cable modem primary-channel

show cable modem service-flow

show cable modem summary

show cable modem vendor
show cable modem verbose

show cable modem service-flow

Use the `show cable modem service-flow` command to display information about all service flows associated with a particular modem.

`show cable modem` { *ip-address* | *mac-address* } `service-flow` [*sf-id*] [`classifiers` | `type` | `uptime` | `verbose`]

Syntax description

`ip-address`	Specifies the IP address of a specific CM to be displayed. If you specify the IP address for a CPE device behind a CM, information for that CM is displayed.
`mac-address`	Identifies the MAC address of a specific CM to be displayed. If you specify the MAC address for a CPE device behind a CM, information for that CM will be displayed.
`service-flow`	Displays a summary of relevant parameters and statistics for all service flows associated with a particular modem.
`sf-id`	(Optional) Displays a summary of relevant parameters and statistics for a specific service flow associated with a particular modem.
`uptime`	(Optional) Displays uptime and inactivity time for a service flow with <Service Flow ID>. The supported types are: • cm-cfg: static SF that was created by the cm config file • dynamic(cmts): dynamically created SF that was initiated by CMTS DSA • dynamic(cm): dynamically created SF that was initiated by CM DSA
`type`	(Optional) Displays the type of service flow with <Service Flow ID>. • UP TIME : time elapsed since the SF was created. If cm-cfg, its time since REG-ACK, if dynamic, its time since DSA-ACK • INACTIVITY TIME : time elapsed since no traffic on the SF (based on SF counters)
`classifiers`	(Optional) Displays the classifiers.
`verbose`	(Optional) Displays comprehensive details for all service flows associated with a particular modem.

Command mode

Exec mode.

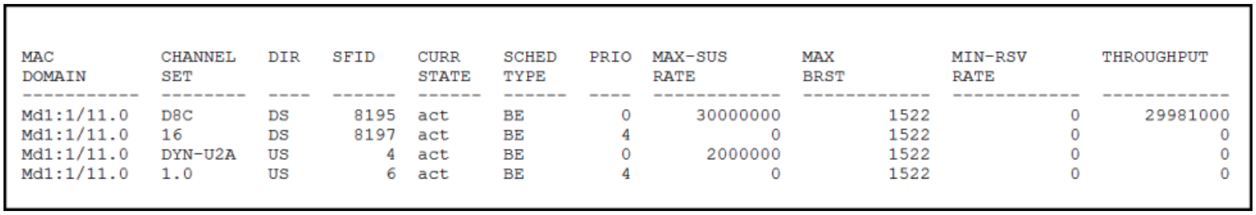
Usage guidelines

The `show cable modem service-flow` command has a verbose and a non-verbose option. The non-verbose command supports live debugging and provides a summary of relevant parameters and statistics for all service flows of a particular modem. The verbose option of the command provides comprehensive details for all service flows associated with a particular modem.

Example

The following example displays summary service flow information about the CM at the given address:

```
show cable modem 90c7.92fb.68d1 service-flow
```



```
MAC          CHANNEL   DIR   SFID    CURR    SCHED   PRIO  MAX-SUS       MAX           MIN-RSV       THROUGHPUT
DOMAIN       SET                     STATE   TYPE          RATE          BRST          RATE
-----------  --------  ----  ------  ------  ------  ----  ------------  ------------  ------------  ------------
Md1:1/11.0   D8C       DS      8195  act     BE         0      30000000          1522             0      29981000
Md1:1/11.0   16        DS      8197  act     BE         4             0          1522             0             0
Md1:1/11.0   DYN-U2A   US         4  act     BE         0       2000000          1522             0             0
Md1:1/11.0   1.0       US         6  act     BE         4             0          1522             0             0
```

Output columns

Field	**Description**
Dir	Service Flow direction (upstream or downstream)
SFID	Service Flow identifier
Curr State	Identifies the current state of the service flow: Active or Inactive
Sched Type	Identifies the service flow’s scheduling type: BE (Best-Effort) or NRTPS (Non-Real-Time Polling Service)
Prio	Traffic priority (0 to 7) given to this service flow
Max-Sus Rate	Maximum Sustained Rate of the Service Flow as set in the CM configuration file `OR SCN`
Max Brst	Maximum Burst of the Service Flow as set in the CM configuration file `OR SCN`
Min-Res Rate	Minimum Reserved Rate of the Service Flow as set in the CM configuration file `OR SCN`
Throughput	Current throughput for this service flow, in packets per second

Related information

show cable modem

show cable modem bonding

show cable modem connectivity

show cable modem counters

show cable modem cpe
show cable modem ipv6
show cable modem primary-channel
show cable modem qos
show cable modem summary
show cable modem vendor
show cable modem verbose

show cable modem summary

To display a summary of the CM State of selected cable modems, use the `show cable modem summary` command.

`show cable modem summary` [`cable-interfaces`] [`total`]

Syntax description

`cable-interfaces`	(Optional). Specifies one or more cable side interfaces for which the CableOS Core displays a summary of cable modem state. If cable-interfaces is omitted, the CableOS Core shows the summary for “md*/*”, that is expanding each MAC domain on the chassis. The CableOS Core displays one interface subtotal line for each for each wild-card expansion of cable-interfaces, and a “Total” for each column at the end of the output.
`total`	The “total” argument instructs the CableOS Core to omit the subtotals for each wildcard expansion of cable-interfaces and to display only the “Command Total” line.
`[ total ]`	If “total” is specified, the CableOS Core omits the column headers and displays only the “Total” lines for md-or-port wildcard expansions (if any) and the “Command Total” line at the end.

Command mode

Exec mode.

Usage guidelines

This command displays a summary of CMs for a single cable interface or upstream, or for a range of cable interfaces or upstreams.

Examples

The following example will display summary information about all the CMs:

```
show cable modem summary
```

Output columns

Field	Description
Interface	A cable interface selected with the cable-interfaces argument of the command. This includes upstream ports and channels, downstream ports and channels, and MAC domains.
Total modems	Total number of CMs in the CableOS Core database associated with the interface
Registered modems	Number of registered CMs using the interface, that is those reported with a CM state of online. A bonding CM is considered to use all downstream channels in its receive channel set and all upstream channels in its transmit channel set.
Active modems	Number of CMs using the interface that are actively attempting to register but not yet online
Offline modems	Number of CMs using the interface that were formerly active or registered but are no longer attempting to register
Command total	Total number of CMs reported in the command

Related information

show cable modem
show cable modem bonding
show cable modem connectivity
show cable modem counters
show cable modem cpe
show cable modem ipv6
show cable modem primary-channel
show cable modem qos
show cable modem service-flow
show cable modem vendor
show cable modem verbose

show cable modem ugs

Use the `show cable modem ugs` command to show a list of cable modems that contain UGS service flows.

`show cable modem ugs` { *single-cm* | *cable-interfaces* }

Syntax description

single-cm	Selects a CM.

cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.

Command mode

Exec mode.

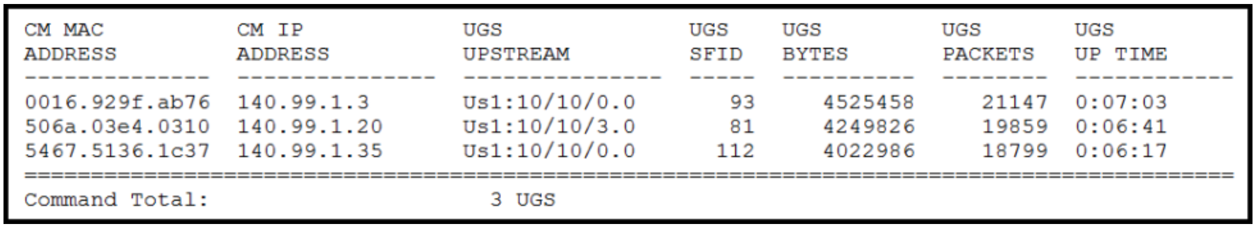
Usage guidelines

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example shows a list of cable modems with UGS service flows:



```
CM MAC          CM IP            UGS              UGS    UGS          UGS       UGS
ADDRESS         ADDRESS          UPSTREAM         SFID   BYTES        PACKETS   UP TIME
--------------  ---------------  ---------------  -----  ----------  --------  ------------
0016.929f.ab76  140.99.1.3       Us1:10/10/0.0       93     4525458     21147  0:07:03
506a.03e4.0310  140.99.1.20      Us1:10/10/3.0       81     4249826     19859  0:06:41
5467.5136.1c37  140.99.1.35      Us1:10/10/0.0      112     4022986     18799  0:06:17
===========================================================================================
Command Total:                     3 UGS
```

show cable modem unregistered

Use the `show cable modem unregistered` command to show a list of cable modems that are not registered with the CMTS.

`show cable modem unregistered {` *single-cm* `}`
`show cable modem unregistered {` *cable-interfaces* `}`

Syntax description

single-cm	Selects a CM.

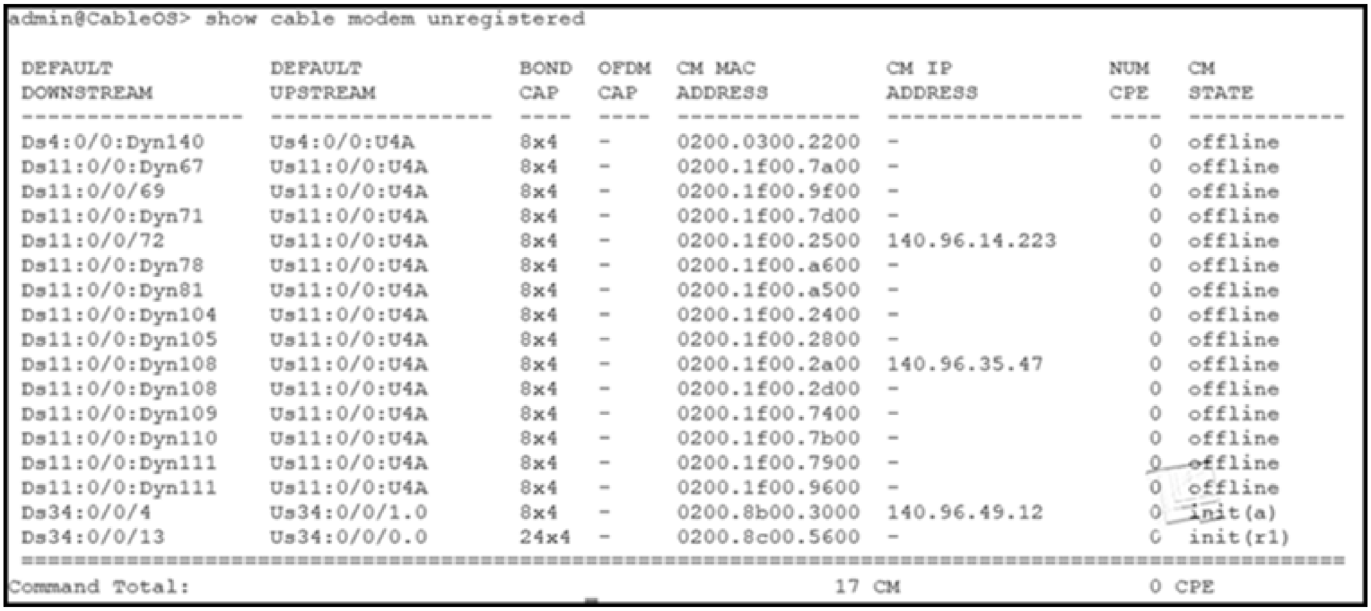
cable-interfaces	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.

Command mode

Exec mode.

Example

The following example shows a list of cable modems that are not registered with the CMTS:



```
admin@CableOS> show cable modem unregistered

 DEFAULT            DEFAULT            BOND  OFDM  CM MAC          CM IP            NUM   CM
 DOWNSTREAM         UPSTREAM           CAP   CAP   ADDRESS         ADDRESS          CPE   STATE
 -----------------  -----------------  ----  ----  --------------  ---------------  ----  ------------
 Ds4:0/0:Dyn140     Us4:0/0:U4A        8x4   -     0200.0300.2200  -                   0  offline
 Ds11:0/0:Dyn67     Us11:0/0:U4A       8x4   -     0200.1f00.7a00  -                   0  offline
 Ds11:0/0/69        Us11:0/0:U4A       8x4   -     0200.1f00.9f00  -                   0  offline
 Ds11:0/0:Dyn71     Us11:0/0:U4A       8x4   -     0200.1f00.7d00  -                   0  offline
 Ds11:0/0/72        Us11:0/0:U4A       8x4   -     0200.1f00.2500  140.96.14.223       0  offline
 Ds11:0/0:Dyn78     Us11:0/0:U4A       8x4   -     0200.1f00.a600  -                   0  offline
 Ds11:0/0:Dyn81     Us11:0/0:U4A       8x4   -     0200.1f00.a500  -                   0  offline
 Ds11:0/0:Dyn104    Us11:0/0:U4A       8x4   -     0200.1f00.2400  -                   0  offline
 Ds11:0/0:Dyn105    Us11:0/0:U4A       8x4   -     0200.1f00.2800  -                   0  offline
 Ds11:0/0:Dyn108    Us11:0/0:U4A       8x4   -     0200.1f00.2a00  140.96.35.47        0  offline
 Ds11:0/0:Dyn108    Us11:0/0:U4A       8x4   -     0200.1f00.2d00  -                   0  offline
 Ds11:0/0:Dyn109    Us11:0/0:U4A       8x4   -     0200.1f00.7400  -                   0  offline
 Ds11:0/0:Dyn110    Us11:0/0:U4A       8x4   -     0200.1f00.7b00  -                   0  offline
 Ds11:0/0:Dyn111    Us11:0/0:U4A       8x4   -     0200.1f00.7900  -                   0  offline
 Ds11:0/0:Dyn111    Us11:0/0:U4A       8x4   -     0200.1f00.9600  -                   0  offline
 Ds34:0/0/4         Us34:0/0/1.0       8x4   -     0200.8b00.3000  140.96.49.12        0  init(a)
 Ds34:0/0/13        Us34:0/0/0.0       24x4  -     0200.8c00.5600  -                   0  init(r1)
 =====================================================================================================
Command Total:                                                 17 CM                   0 CPE
```

Related information

show cable modem registered

show cable modem uptime

Use the `show cable modem uptime` command to display the uptime and online status of all or a specific MAC domain’s cable modems.

```
show cable modem [{mac-domain | CM MAC | IP address | cable-interface}]
uptime
```

Syntax description

`no argument`	Provides data for all MAC domains and all cable modems within each MAC domain.
`mac-domain`	(Optional) md vc:vs/pp.d. Specific MAC domain for which to provide Cable Modem uptime and online status (Common for all `show cable modem` commands).
`CM MAC`	(Optional) Provides uptime and online status for the cable modem with specific MAC address (Common for all `show cable modem` commands).
`IP Address`	(Optional) Provides uptime and online status for the cable modem with specific ip-address (Common for all `show cable modem` commands).
`cable-interface`	(Optional) Provides uptime and online status for the cable modem on one or more cable-side interfaces (Common for all `show cable modem` commands).

Command mode

Exec mode.

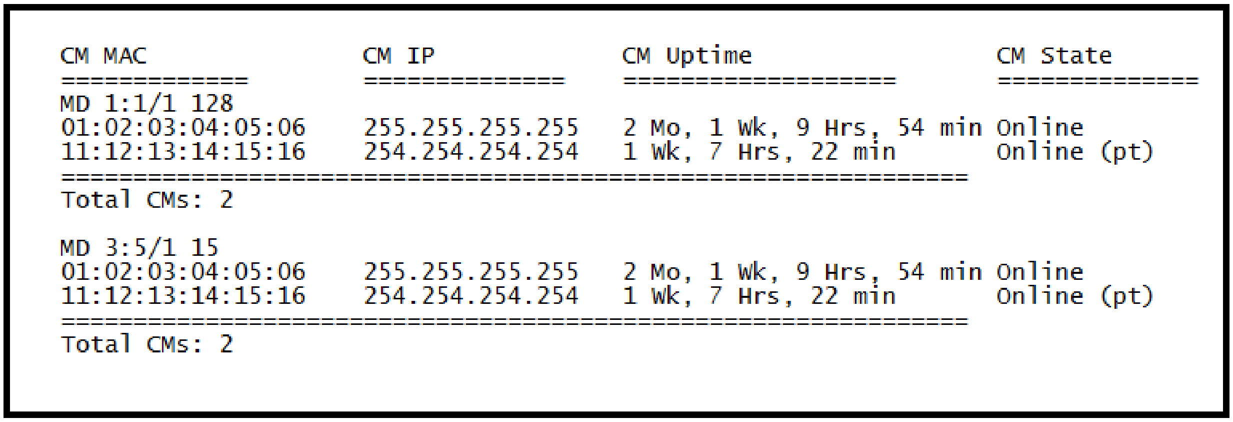
Usage guidelines

Provides data only for configured and active MAC domains. For long periods, data is shown using this pattern: 15 Mo, 1 Wk, 3 Days, 2 min.

Examples

The following example displays information for all cable modems:

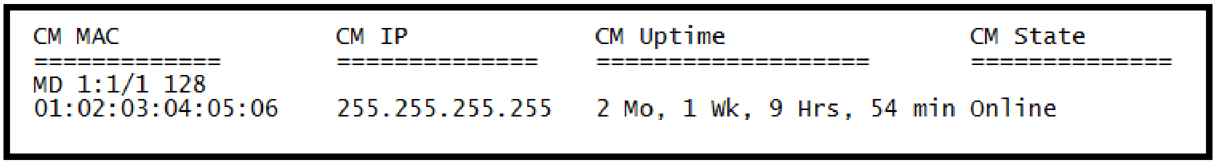
```
show cable modem uptime
```



```
CM MAC              CM IP             CM Uptime                  CM State
=============       ==============    ===================        ==============
MD 1:1/1 128
01:02:03:04:05:06   255.255.255.255   2 Mo, 1 Wk, 9 Hrs, 54 min  Online
11:12:13:14:15:16   254.254.254.254   1 Wk, 7 Hrs, 22 min        Online (pt)
=====================================================================
Total CMs: 2

MD 3:5/1 15
01:02:03:04:05:06   255.255.255.255   2 Mo, 1 Wk, 9 Hrs, 54 min  Online
11:12:13:14:15:16   254.254.254.254   1 Wk, 7 Hrs, 22 min        Online (pt)
=====================================================================
Total CMs: 2
```

The following example displays information for a specific CM MAC address:

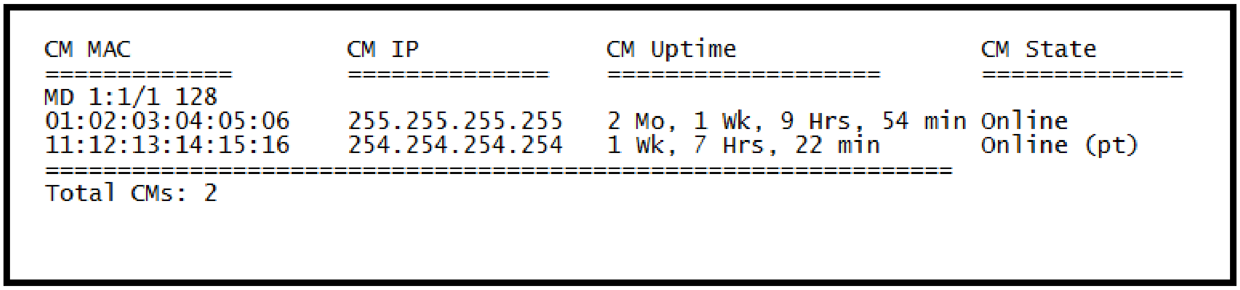
```
show cable modem uptime 01:02:03:04:05:06
```



```
CM MAC                CM IP              CM Uptime                  CM State
=============         ==============     ===================        ==============
MD 1:1/1 128
01:02:03:04:05:06     255.255.255.255    2 Mo, 1 Wk, 9 Hrs, 54 min Online
```

The following example displays information for a specific MAC domain:

```
show cable modem uptime MD 1:1/1 128
```



```
CM MAC                CM IP              CM Uptime                  CM State
=============         ==============     ===================        ==============
MD 1:1/1 128
01:02:03:04:05:06     255.255.255.255    2 Mo, 1 Wk, 9 Hrs, 54 min Online
11:12:13:14:15:16     254.254.254.254    1 Wk, 7 Hrs, 22 min        Online (pt)
===============================================================
Total CMs: 2
```

show cable modem vendor

To display the vendor name or Organizational Unique Identifier (OUI) for the CMs on each cable interface, use the `show cable modem vendor` command.

`show cable modem [ { cable-interface | single-cm ] | vendor [ | summary } ]`

Syntax description

`single-cm`	Selects a specific CM.
`cable-interfaces`	(Optional) Selects one or more cable-side interfaces. If *cable-interfaces* is present, the command includes only CMs operating on those cable-interfaces, with grouping and subtotals for each wild-carded interface. If omitted, the command includes all CMs on the chassis, without grouping or sub-totals.
`summary`	(Optional) Displays the total numbers for each vendor and OUI, along with the total numbers of those vendor's CMs that are currently registered with the CMTS, active, or offline.

Command mode

Exec mode.

Usage guidelines

This command displays the vendor name for each CM. If the vendor name has not been defined by the cable modem vendor command, the command displays the OUI value for the modem's vendor.

NOTE:

The Institute of Electrical and Electronics Engineers (IEEE) is the official issuer of OUI values.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ----------------------------------------------------------------------------
 x
```

Examples

The following example will display vendor information about the CMs:

```
show cable modem vendor
```

Related information

show cable modem
show cable modem bonding
show cable modem connectivity
show cable modem counters
show cable modem cpe
show cable modem ipv6
show cable modem primary-channel
show cable modem qos
show cable modem service-flow
show cable modem summary
show cable modem verbose

show cable modem verbose

To show the most CableOS Core database information pertaining to a cable modem, enter the following command:

`show cable modem` [{ *cm-mac-addr* `| cm-ip-addr` }] `verbose`

Syntax description

cm-mac-addr	Optional. MAC address of one cable modem known to the CableOS Core.
`cm-ip-addr`	IP address of the cable modem.

Command mode

Exec mode.

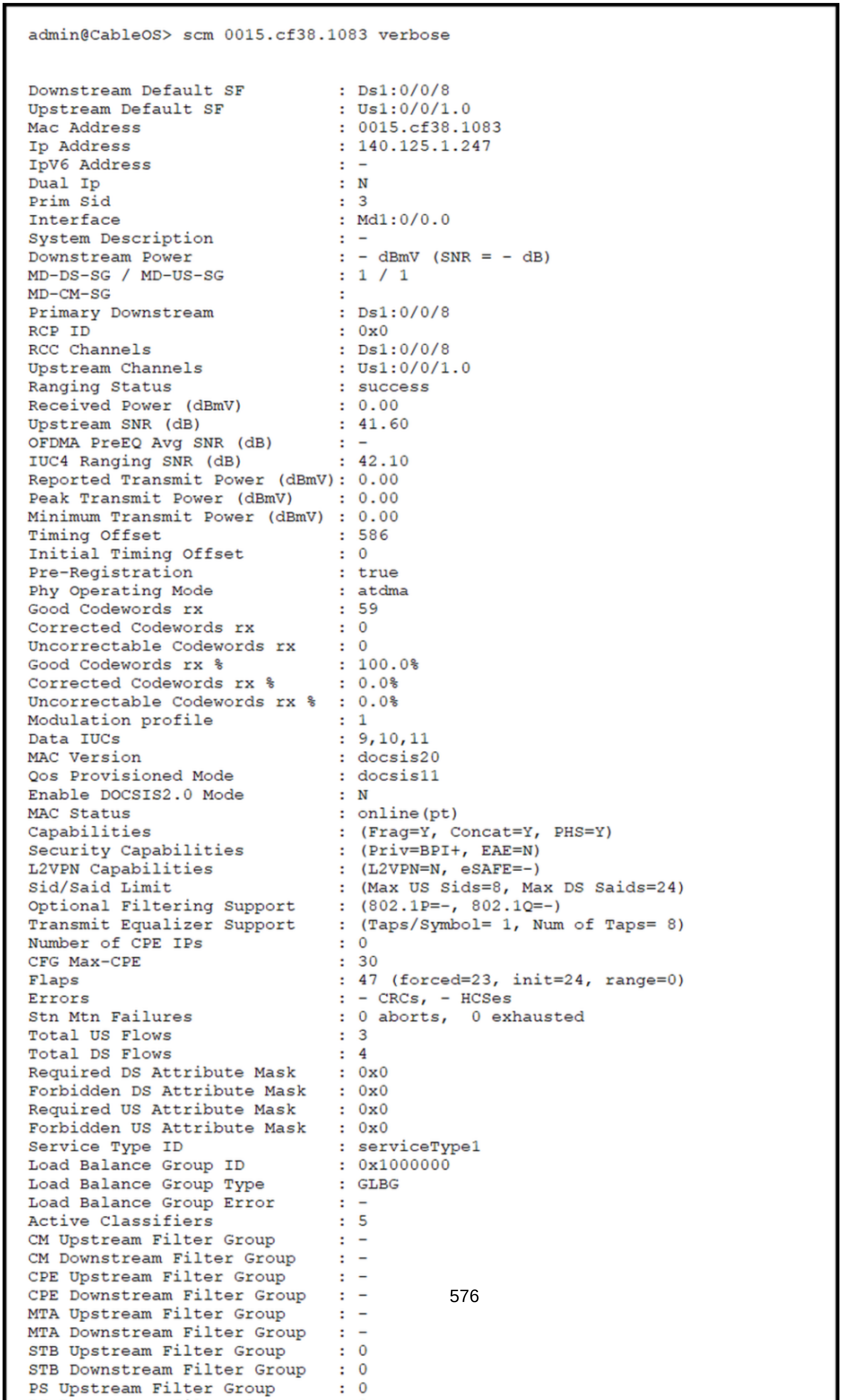
Usage guidelines

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Example

The following example shows the output from a CM with a MAC address of a408.f516.2920



```
admin@CableOS> scm 0015.cf38.1083 verbose


Downstream Default SF         : Ds1:0/0/8
Upstream Default SF           : Us1:0/0/1.0
Mac Address                   : 0015.cf38.1083
Ip Address                    : 140.125.1.247
IpV6 Address                  : -
Dual Ip                       : N
Prim Sid                      : 3
Interface                     : Md1:0/0.0
System Description            : -
Downstream Power              : - dBmV (SNR = - dB)
MD-DS-SG / MD-US-SG           : 1 / 1
MD-CM-SG                      :
Primary Downstream            : Ds1:0/0/8
RCP ID                        : 0x0
RCC Channels                  : Ds1:0/0/8
Upstream Channels             : Us1:0/0/1.0
Ranging Status                : success
Received Power (dBmV)         : 0.00
Upstream SNR (dB)             : 41.60
OFDMA PreEQ Avg SNR (dB)      : -
IUC4 Ranging SNR (dB)         : 42.10
Reported Transmit Power (dBmV): 0.00
Peak Transmit Power (dBmV)    : 0.00
Minimum Transmit Power (dBmV) : 0.00
Timing Offset                 : 586
Initial Timing Offset         : 0
Pre-Registration              : true
Phy Operating Mode            : atdma
Good Codewords rx             : 59
Corrected Codewords rx        : 0
Uncorrectable Codewords rx    : 0
Good Codewords rx %           : 100.0%
Corrected Codewords rx %      : 0.0%
Uncorrectable Codewords rx %  : 0.0%
Modulation profile            : 1
Data IUCs                     : 9,10,11
MAC Version                   : docsis20
Qos Provisioned Mode          : docsis11
Enable DOCSIS2.0 Mode         : N
MAC Status                    : online(pt)
Capabilities                  : (Frag=Y, Concat=Y, PHS=Y)
Security Capabilities         : (Priv=BPI+, EAE=N)
L2VPN Capabilities            : (L2VPN=N, eSAFE=-)
Sid/Said Limit                : (Max US Sids=8, Max DS Saids=24)
Optional Filtering Support    : (802.1P=-, 802.1Q=-)
Transmit Equalizer Support    : (Taps/Symbol= 1, Num of Taps= 8)
Number of CPE IPs             : 0
CFG Max-CPE                   : 30
Flaps                         : 47 (forced=23, init=24, range=0)
Errors                        : - CRCs, - HCSes
Stn Mtn Failures              : 0 aborts,  0 exhausted
Total US Flows                : 3
Total DS Flows                : 4
Required DS Attribute Mask    : 0x0
Forbidden DS Attribute Mask   : 0x0
Required US Attribute Mask    : 0x0
Forbidden US Attribute Mask   : 0x0
Service Type ID               : serviceType1
Load Balance Group ID         : 0x1000000
Load Balance Group Type       : GLBG
Load Balance Group Error      : -
Active Classifiers            : 5
CM Upstream Filter Group      : -
CM Downstream Filter Group    : -
CPE Upstream Filter Group     : -
CPE Downstream Filter Group   : -
MTA Upstream Filter Group     : -
MTA Downstream Filter Group   : -
STB Upstream Filter Group     : 0
STB Downstream Filter Group   : 0
PS Upstream Filter Group      : 0
```

Related information

show cable modem

show cable modem bonding

show cable modem connectivity

show cable modem counters

show cable modem cpe

show cable modem ipv6

show cable modem primary-channel

show cable modem qos

show cable modem service-flow

show cable modem summary

show cable modem vendor

show cable modulation-profile

Use the `show cable modulation-profile` command to display information about the upstream modulation profile.

```
show cable modulation-profile [ mod ]
```

Syntax description

`mod`	The modulation profile index to display.

Command mode

Exec mode.

Usage guidelines

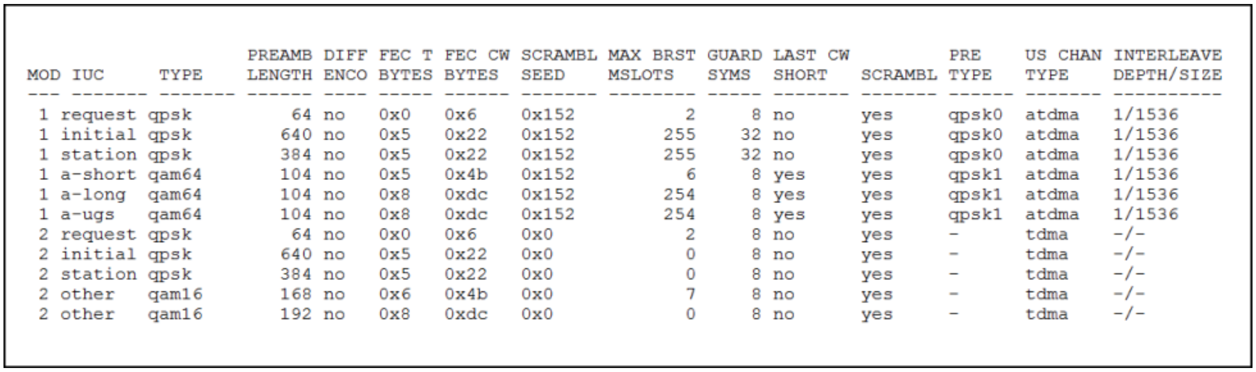
Unless restricted to a single profile, this command displays upstream modulation profiles for all available profiles. It is based on the configuration command.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

```
show cable modulation-profile
```



```
                    PREAMB DIFF FEC T FEC CW SCRAMBL MAX BRST GUARD LAST CW         PRE    US CHAN INTERLEAVE
MOD IUC     TYPE    LENGTH ENCO BYTES BYTES  SEED    MSLOTS   SYMS  SHORT   SCRAMBL TYPE   TYPE    DEPTH/SIZE
--- ------- ------- ------ ---- ----- ------ ------- -------- ----- ------- ------- ------ ------- ----------
 1 request qpsk         64 no   0x0   0x6    0x152          2     8 no      yes     qpsk0  atdma   1/1536
 1 initial qpsk        640 no   0x5   0x22   0x152        255    32 no      yes     qpsk0  atdma   1/1536
 1 station qpsk        384 no   0x5   0x22   0x152        255    32 no      yes     qpsk0  atdma   1/1536
 1 a-short qam64       104 no   0x5   0x4b   0x152          6     8 yes     yes     qpsk1  atdma   1/1536
 1 a-long  qam64       104 no   0x8   0xdc   0x152        254     8 yes     yes     qpsk1  atdma   1/1536
 1 a-ugs   qam64       104 no   0x8   0xdc   0x152        254     8 yes     yes     qpsk1  atdma   1/1536
 2 request qpsk         64 no   0x0   0x6    0x0            2     8 no      yes     -      tdma    -/-
 2 initial qpsk        640 no   0x5   0x22   0x0            0     8 no      yes     -      tdma    -/-
 2 station qpsk        384 no   0x5   0x22   0x0            0     8 no      yes     -      tdma    -/-
 2 other   qam16       168 no   0x6   0x4b   0x0            7     8 no      yes     -      tdma    -/-
 2 other   qam16       192 no   0x8   0xdc   0x0            0     8 no      yes     -      tdma    -/-
```

show cable mod-prof-ofdma

Use the `show cable mod-prof-ofdma` command to display a summary of the configured modulation profiles for OFDMA.

`show cable mod-prof-ofdma` [`mod-prof-ofdma-index`]

Syntax description

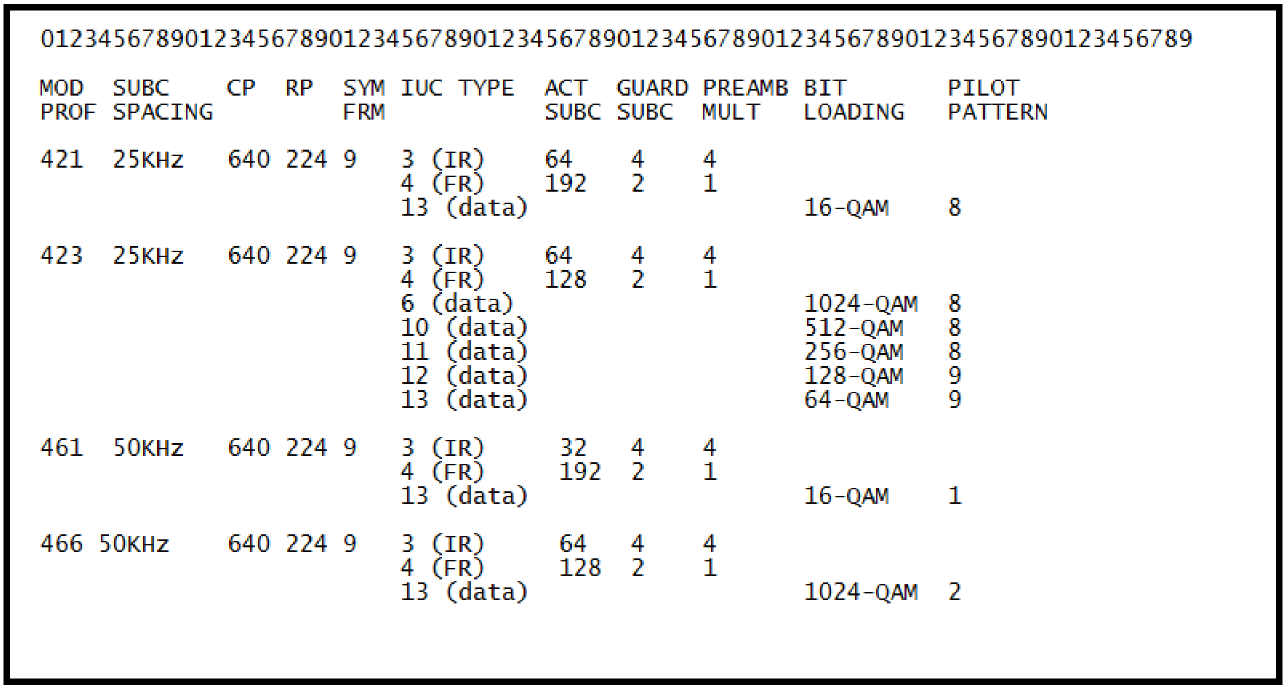
`mod-prof-ofdma-index`	Optionally selects one of the OFDMA modulation profiles configured with "cable mod-prof-ofdma mod-prof-ofdma-index". If omitted, the CMTS shows all OFDMA modulation profiles.

Command mode

Exec mode.

Example

```
show cable mod-prof-ofdma
```



```
01234567890123456789012345678901234567890123456789012345678901234567890123456789

MOD  SUBC    CP  RP  SYM IUC TYPE  ACT  GUARD PREAMB BIT       PILOT
PROF SPACING         FRM             SUBC SUBC MULT   LOADING   PATTERN

421  25KHz   640 224 9   3 (IR)    64    4    4
                         4 (FR)    192   2    1
                         13 (data)                   16-QAM    8

423  25KHz   640 224 9   3 (IR)    64    4    4
                         4 (FR)    128   2    1
                         6 (data)                    1024-QAM  8
                         10 (data)                   512-QAM   8
                         11 (data)                   256-QAM   8
                         12 (data)                   128-QAM   9
                         13 (data)                   64-QAM    9

461  50KHz   640 224 9   3 (IR)     32   4    4
                         4 (FR)     192  2    1
                         13 (data)                   16-QAM    1

466 50KHz    640 224 9   3 (IR)     64   4    4
                         4 (FR)     128  2    1
                         13 (data)                   1024-QAM  2
```

Output columns

Field	Description
MOD PROF	The identifier for the modulation profile mod-prof-ofdma-index configured with `cable mod-prof-ofdma` *mod-prof-ofdma-index*.
SUBC SPACING	The width of subcarriers *subcarrier-spacing* configured with `cable mod-prof-ofdma * subcarrier-spacing` *subcarrier-spacing*.
CP	The cyclic-prefix number of 102.4 MHz samples *cyclic-prefix* configured with `cable mod-prof-ofdma * cyclic-prefix` *cyclic-prefix*.
RP	The rolloff-period number of 102.4 MHz samples *rolloff-period* configured with `cable mod-prof-ofdma * rolloff-period` *rolloff-period*.
SYM FRM	The symbols per OFDM frame *symbols-per-frame* configured with `cable mod-prof-ofdma * symbols-per-frame` *symbols-per-frame*.
IUC TYPE	The index of an interval usage code defined by the profile. Every OFDM profile has at least "3 (IR)" for initial ranging, "4 (FR)" for fine ranging, and "13 (data)" for pre-registration data.
ACT SUBC	For "3 (IR)" intervals, the number of scheduled initial ranging subcarriers, which may exceed the configured `cable mod-prof-ofdma * initial-ranging subcarriers` *init-ranging-subcarriers*. For "4 (FR)" intervals, the number of scheduled fine ranging subcarriers, which may exceed the configured `cable mod-prof-ofdma * fine-ranging subcarriers` *init-ranging-subcarriers* .

Field	Description
GUARD SUBC	For "3 (IR)" intervals, the number of scheduled initial ranging guard subcarriers, which may exceed the configured cable mod-prof-ofdma * initial-ranging guard-band *init-guard-subcarriers*. For "4 (FR)" intervals, the number of scheduled fine ranging guard subcarriers, which may exceed the configured `cable mod-prof-ofdma * fine-ranging guard-band` *guard-ranging-subcarriers*.
PREAM MULT	For "3 (IR)" intervals, the multiple of initial ranging subcarriers *init-preamble-multiplier* configured with `cable mod-prof-ofdma * initial-ranging preamble-multiplier` *init-preamble-multiplier*. For "4 (FR)" intervals, the preamble multiplier is always 1.
BIT LOADING	For data intervals only, the default modulation for the interval usage code *ofdma-mod-type* configured with `cable mod-prof-ofdma * data-iuc * modulation` *ofdma-mod-type*. For initial ranging and fine ranging intervals, CMs always transmit with BPSK bit modulation.
PILOT PATTERN	For data intervals only, the pilot pattern *pilot-pattern* configured with `cable mod-prof-ofdma * data-iuc * pilot-pattern` *pilot-pattern*.

Related information

cable mod-prof-ofdma

cable us-rf-port ofdma-channel

show cable us-rf-port ofdma-channel

show cable multicast

Use the `show cable multicast` command to display information about the multicast configuration.

`show cable multicast [ dsid ] [ db ]`

Syntax description

`dsid`	Optional Shows how many packets were transferred to each multicast group
`db`	Optional Shows the subscribers behind each multicast group

Default

This command has no default value.

Command mode

Exec mode

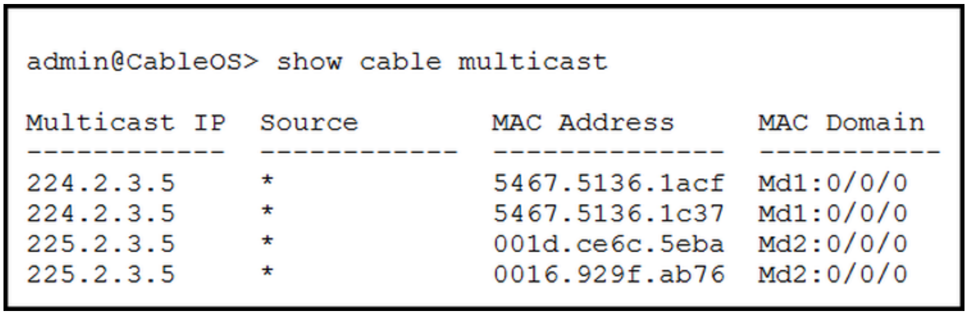
Usage guidelines

Without any optional keywords, this command shows which multicast groups are used by each CM.

Examples

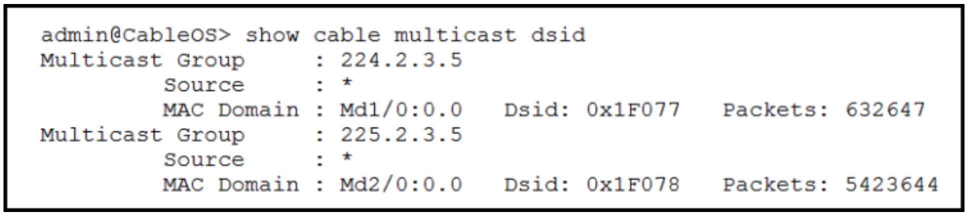
The following are examples of the `show cable multicast` output.

This example shows the multicast sessions learned by CableOS Core:



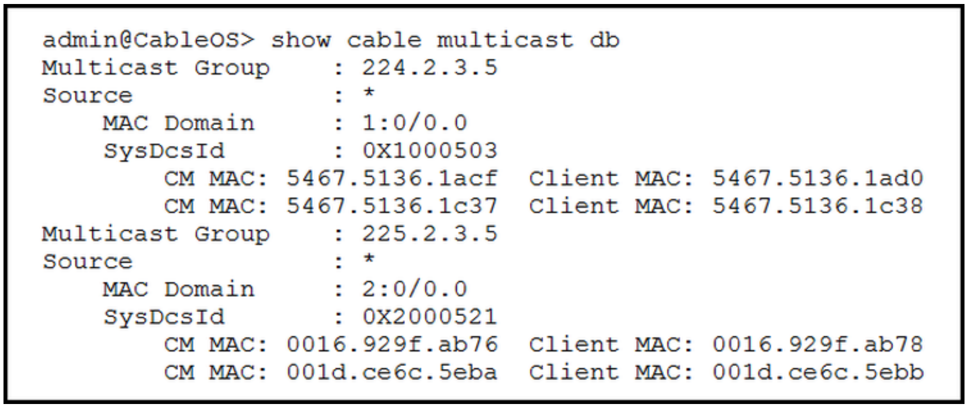
```
admin@CableOS> show cable multicast

Multicast IP  Source        MAC Address     MAC Domain
------------  ------------  --------------  -----------
224.2.3.5     *             5467.5136.1acf  Md1:0/0/0
224.2.3.5     *             5467.5136.1c37  Md1:0/0/0
225.2.3.5     *             001d.ce6c.5eba  Md2:0/0/0
225.2.3.5     *             0016.929f.ab76  Md2:0/0/0
```

This example shows the entire DSID database content:



```
admin@CableOS> show cable multicast dsid
Multicast Group     : 224.2.3.5
         Source     : *
         MAC Domain : Md1/0:0.0   Dsid: 0x1F077   Packets: 632647
Multicast Group     : 225.2.3.5
         Source     : *
         MAC Domain : Md2/0:0.0   Dsid: 0x1F078   Packets: 5423644
```

This example shows the entire database content:



```
admin@CableOS> show cable multicast db
Multicast Group     : 224.2.3.5
Source              : *
    MAC Domain      : 1:0/0.0
    SysDcsId        : 0X1000503
        CM MAC: 5467.5136.1acf  Client MAC: 5467.5136.1ad0
        CM MAC: 5467.5136.1c37  Client MAC: 5467.5136.1c38
Multicast Group     : 225.2.3.5
Source              : *
    MAC Domain      : 2:0/0.0
    SysDcsId        : 0X2000521
        CM MAC: 0016.929f.ab76  Client MAC: 0016.929f.ab78
        CM MAC: 001d.ce6c.5eba  Client MAC: 001d.ce6c.5ebb
```

Related information

cable mcast

cable mac-domain * mcast-channel-set

show cable privacy

Use the `show cable privacy` command to display Baseline Privacy Interface Plus (BPI+) certificate information.

`show cable privacy{manufacturer-cert-list | root-cert-list}`

Syntax description

`manufacturer-cert-list`	Displays the BPI manufacturer certificate verification list.
`root-cert-list`	Displays the BPI root certificate verification list.

Command mode

Exec mode.

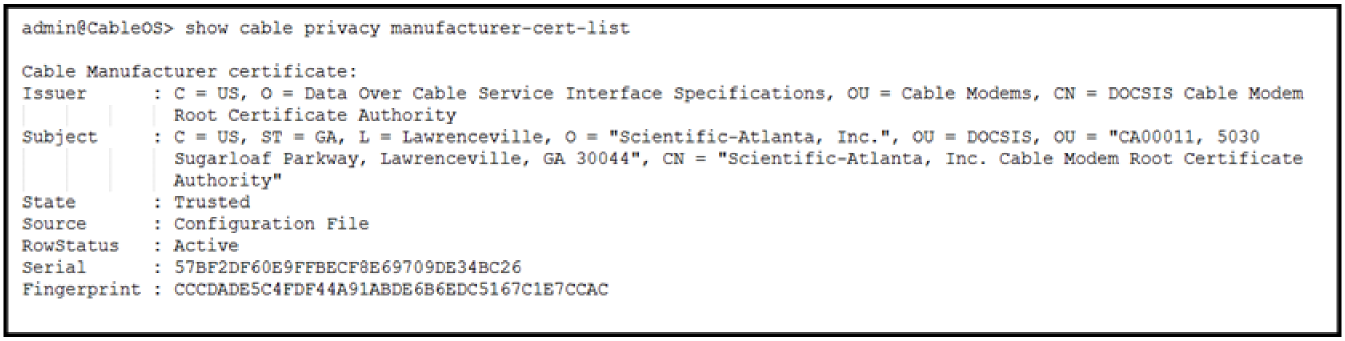
Usage guidelines

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

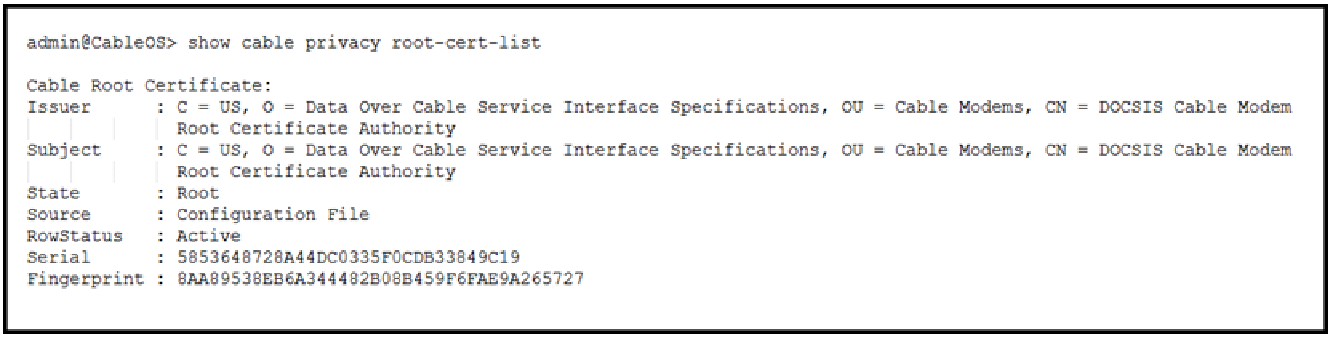
Examples

This example shows the manufacturer certificate verification list:



```
admin@CableOS> show cable privacy manufacturer-cert-list

Cable Manufacturer certificate:
Issuer      : C = US, O = Data Over Cable Service Interface Specifications, OU = Cable Modems, CN = DOCSIS Cable Modem
              Root Certificate Authority
Subject     : C = US, ST = GA, L = Lawrenceville, O = "Scientific-Atlanta, Inc.", OU = DOCSIS, OU = "CA00011, 5030
              Sugarloaf Parkway, Lawrenceville, GA 30044", CN = "Scientific-Atlanta, Inc. Cable Modem Root Certificate
              Authority"
State       : Trusted
Source      : Configuration File
RowStatus   : Active
Serial      : 57BF2DF60E9FFBECF8E69709DE34BC26
Fingerprint : CCCDADE5C4FDF44A91ABDE6B6EDC5167C1E7CCAC
```

This example shows the root certificate verification list:



```
admin@CableOS> show cable privacy root-cert-list

Cable Root Certificate:
Issuer      : C = US, O = Data Over Cable Service Interface Specifications, OU = Cable Modems, CN = DOCSIS Cable Modem
              Root Certificate Authority
Subject     : C = US, O = Data Over Cable Service Interface Specifications, OU = Cable Modems, CN = DOCSIS Cable Modem
              Root Certificate Authority
State       : Root
Source      : Configuration File
RowStatus   : Active
Serial      : 5853648728A44DC0335F0CDB33849C19
Fingerprint : 8AA89538EB6A344482B08B459F6FAE9A265727
```

Output columns

Field	**Description**
Issuer	Identifies the entity that has signed and issued the certificate
Subject	Identifies the entity associated with the public key stored in the subject public key field
State	One of Root, Chained, Trusted, or Untrusted
Source	This object indicates how the certificate reached the CMTS
Row Status	Either Active or Not In Service
Serial	Assigned by the CA to each certificate. It is unique for each certificate
Fingerprint	A short hexadecimal string used to identify a longer public key

show cable proto-throttle

Use the `show cable proto-throttle` command to display the number of ARP/ND/IGMP requests and ARP/ND/IGMP reply packets dropped respectively for the CPEs that were throttled. This command also provides the option to display only those devices that have dropped more than a specified minimum number of ARP/ND/IGMP packets.

NOTE:

ARPND requests and replies are counted separately.

`show cable proto-throttle  [ detail ] [ arpnd-replies-throttled` <*min-count*> `] [ arpnd-requests-throttled` <*min-count*> `] [igmp-msgs-throttled` <*min-count*>`]`

Syntax description

`detail`	Provides detailed information on throttled CPEs and their CMs.
`arpnd-replies-throttled`<*min-count*>	Displays only those devices that have dropped more than the specified minimum number of ARP/ND reply packets.
`arpnd-requests-throttled`<*min-count*>	Displays only those devices that have dropped more than the specified minimum number of ARP/ND request packets.

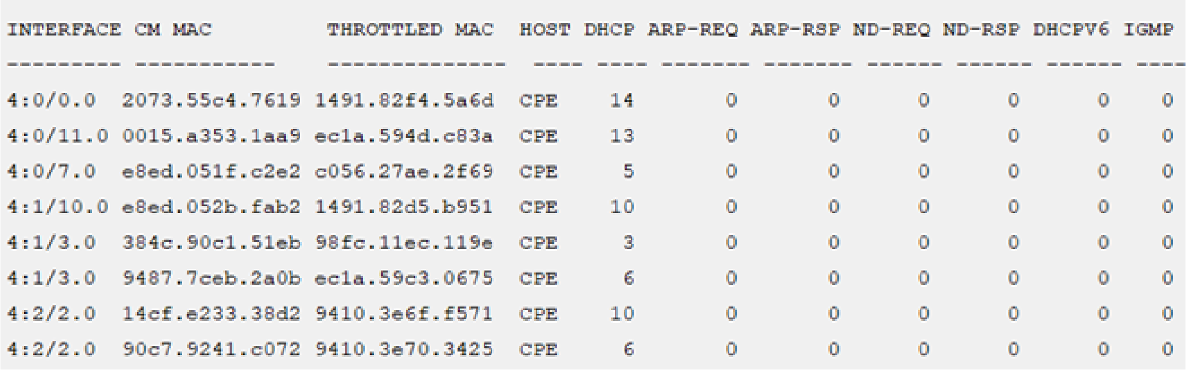
`igmp-msgs-throttled` *<min-count>*	Displays only those devices that have dropped more than the specified minimum number of IGMP message packets.

Command mode

Exec mode.

Example

```
admin@CableOS> show cable proto-throttle detail
DHCP throttling: on
ARP throttling: off
ND throttling: off
DHCPv6 throttling: off
IGMP throttling: off
rate: 8
burst: 8

Drop counts:
INTERFACE      DHCP     ARP      ND       DHCPV6   IGMP
-------------  -------  -------  -------  -------  -------
Md4:0/0.0           14        0        0        0        0
Md4:0/1.0            0        0        0        0        0
Md4:0/10.0           0        0        0        0        0
Md4:0/11.0          13        0        0        0        0
Md4:0/2.0            0        0        0        0        0
Md4:0/3.0            0        0        0        0        0
Md4:0/4.0            0        0        0        0        0
Md4:0/5.0            0        0        0        0        0
Md4:0/6.0            0        0        0        0        0
Md4:0/7.0            5        0        0        0        0
Md4:0/8.0            0        0        0        0        0
Md4:0/9.0            0        0        0        0        0
Md4:1/0.0            0        0        0        0        0
Md4:1/1.0            0        0        0        0        0
Md4:1/10.0          10        0        0        0        0
Md4:1/11.0           0        0        0        0        0
Md4:1/2.0            0        0        0        0        0
Md4:1/3.0            9        0        0        0        0
Md4:1/4.0            0        0        0        0        0
Md4:1/5.0            0        0        0        0        0
Md4:1/6.0            0        0        0        0        0
Md4:1/7.0            0        0        0        0        0
Md4:1/8.0            0        0        0        0        0
Md4:1/9.0            0        0        0        0        0
Md4:2/0.0            0        0        0        0        0
Md4:2/1.0            0        0        0        0        0
Md4:2/10.0           0        0        0        0        0
Md4:2/11.0           0        0        0        0        0
Md4:2/2.0           16        0        0        0        0
Md4:2/3.0            0        0        0        0        0
Md4:2/4.0            0        0        0        0        0
Md4:2/5.0            0        0        0        0        0
Md4:2/7.0            0        0        0        0        0
Md4:2/8.0            0        0        0        0        0
Md4:2/9.0            0        0        0        0        0
```



```
INTERFACE CM MAC         THROTTLED MAC  HOST DHCP ARP-REQ ARP-RSP ND-REQ ND-RSP DHCPV6 IGMP
--------- -----------    --------------  ---- ---- ------- ------- ------ ------ ------ ----
4:0/0.0  2073.55c4.7619 1491.82f4.5a6d  CPE    14       0       0      0      0      0    0
4:0/11.0 0015.a353.1aa9 ec1a.594d.c83a  CPE    13       0       0      0      0      0    0
4:0/7.0  e8ed.051f.c2e2 c056.27ae.2f69  CPE     5       0       0      0      0      0    0
4:1/10.0 e8ed.052b.fab2 1491.82d5.b951  CPE    10       0       0      0      0      0    0
4:1/3.0  384c.90c1.51eb 98fc.11ec.119e  CPE     3       0       0      0      0      0    0
4:1/3.0  9487.7ceb.2a0b ec1a.59c3.0675  CPE     6       0       0      0      0      0    0
4:2/2.0  14cf.e233.38d2 9410.3e6f.f571  CPE    10       0       0      0      0      0    0
4:2/2.0  90c7.9241.c072 9410.3e70.3425  CPE     6       0       0      0      0      0    0
```

Related information

cable proto-throttle

clear cable proto-throttle counters

show cable ptp time-property

Use the `show cable ptp time-property` command to display the PTP clock time properties.

```
show cable ptp time-property
```

Command mode

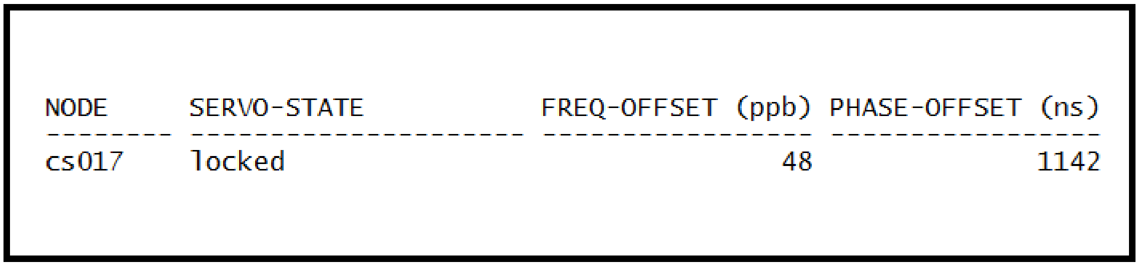
Exec mode.

Usage guidelines

Examples

The following example shows the clock properties :

```
show cable ptp time-property
```



```
NODE     SERVO-STATE           FREQ-OFFSET (ppb) PHASE-OFFSET (ns)
-------- --------------------- ----------------- -----------------
cs017    locked                               48              1142
```

Output columns

Field	Description
Node	The Core node
SERVO-STATE	The PTP status, which can be either locked or unlocked

Field	Description
FREQ-OFFSET (ppb)	The frequency offset from the GM in Parts Per Billion (clock offset * 10^12)
PHASE-OFFSET (ns)	The phase offset from the GM in nanoseconds

Related information

cable ptp

show cable rcp

Use the `show cable rcp` command to display information about RCPs in the system..

`show cable rcp`

To show details of a specific RCP, use the following

`show cable rcp` [*rcp-id*] [`verbose`]

Syntax description

rcp-id	Selects one of the RCPs stored on CMTS side. Hex numeric string, e.g.: **"00 10 18 80 61"**

Default

This command has no default value.

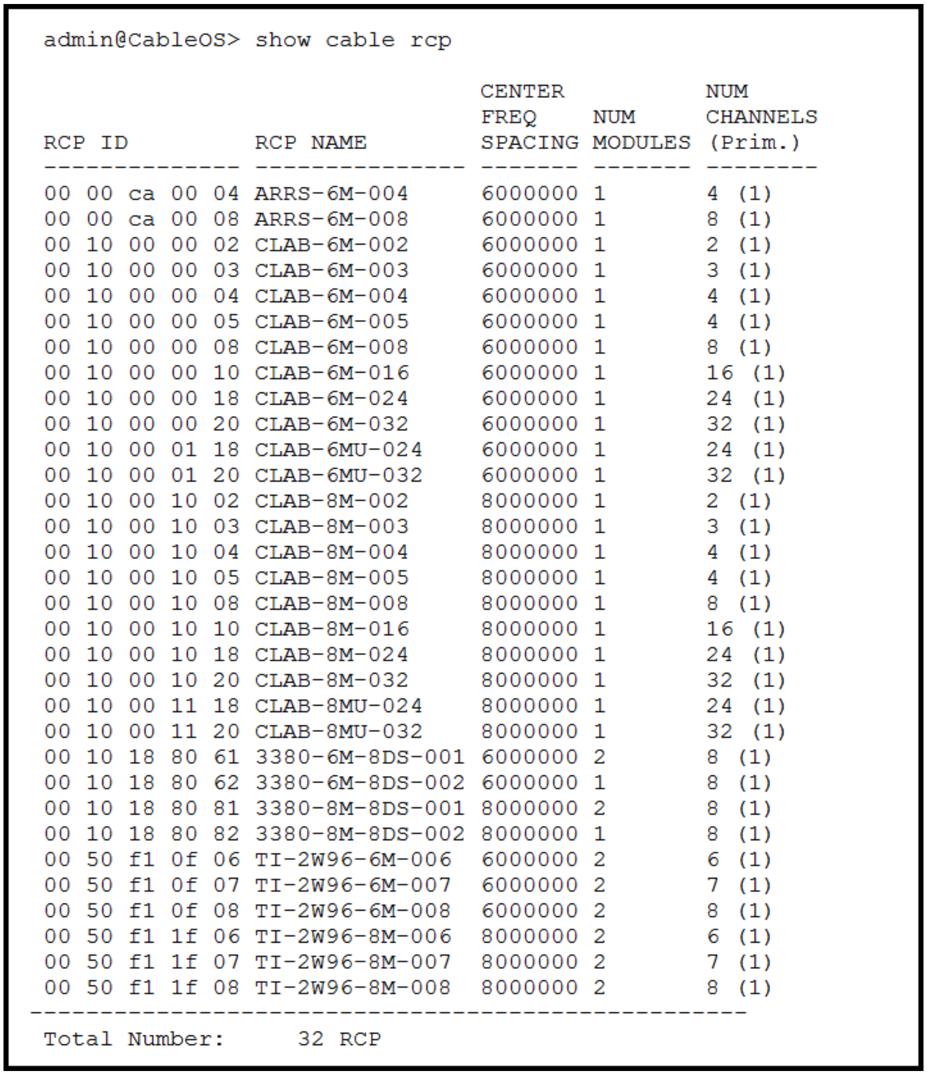
Command mode

Exec mode

Examples

The following example displays general information for all RCPs:

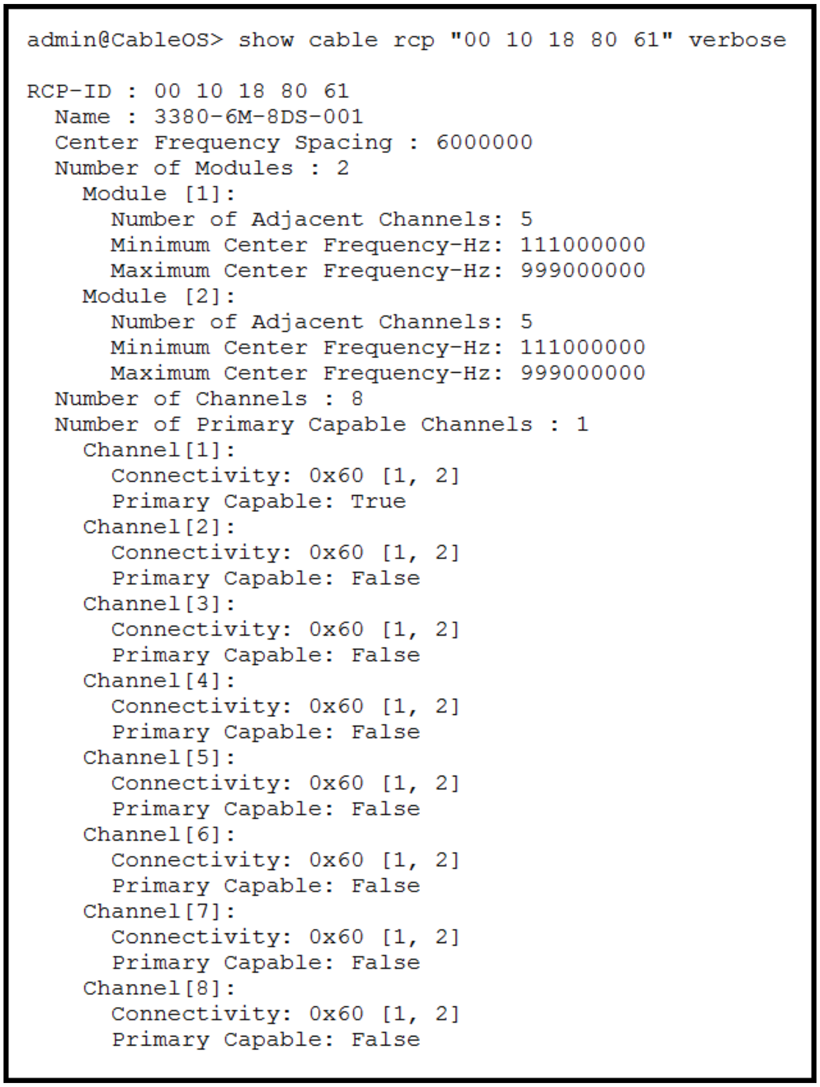
```
show cable rcp
```



```
admin@CableOS> show cable rcp

                               CENTER          NUM
                               FREQ    NUM     CHANNELS
RCP ID         RCP NAME        SPACING MODULES (Prim.)
-------------- --------------- ------- ------- --------
00 00 ca 00 04 ARRS-6M-004     6000000 1       4 (1)
00 00 ca 00 08 ARRS-6M-008     6000000 1       8 (1)
00 10 00 00 02 CLAB-6M-002     6000000 1       2 (1)
00 10 00 00 03 CLAB-6M-003     6000000 1       3 (1)
00 10 00 00 04 CLAB-6M-004     6000000 1       4 (1)
00 10 00 00 05 CLAB-6M-005     6000000 1       4 (1)
00 10 00 00 08 CLAB-6M-008     6000000 1       8 (1)
00 10 00 00 10 CLAB-6M-016     6000000 1       16 (1)
00 10 00 00 18 CLAB-6M-024     6000000 1       24 (1)
00 10 00 00 20 CLAB-6M-032     6000000 1       32 (1)
00 10 00 01 18 CLAB-6MU-024    6000000 1       24 (1)
00 10 00 01 20 CLAB-6MU-032    6000000 1       32 (1)
00 10 00 10 02 CLAB-8M-002     8000000 1       2 (1)
00 10 00 10 03 CLAB-8M-003     8000000 1       3 (1)
00 10 00 10 04 CLAB-8M-004     8000000 1       4 (1)
00 10 00 10 05 CLAB-8M-005     8000000 1       4 (1)
00 10 00 10 08 CLAB-8M-008     8000000 1       8 (1)
00 10 00 10 10 CLAB-8M-016     8000000 1       16 (1)
00 10 00 10 18 CLAB-8M-024     8000000 1       24 (1)
00 10 00 10 20 CLAB-8M-032     8000000 1       32 (1)
00 10 00 11 18 CLAB-8MU-024    8000000 1       24 (1)
00 10 00 11 20 CLAB-8MU-032    8000000 1       32 (1)
00 10 18 80 61 3380-6M-8DS-001 6000000 2       8 (1)
00 10 18 80 62 3380-6M-8DS-002 6000000 1       8 (1)
00 10 18 80 81 3380-8M-8DS-001 8000000 2       8 (1)
00 10 18 80 82 3380-8M-8DS-002 8000000 1       8 (1)
00 50 f1 0f 06 TI-2W96-6M-006  6000000 2       6 (1)
00 50 f1 0f 07 TI-2W96-6M-007  6000000 2       7 (1)
00 50 f1 0f 08 TI-2W96-6M-008  6000000 2       8 (1)
00 50 f1 1f 06 TI-2W96-8M-006  8000000 2       6 (1)
00 50 f1 1f 07 TI-2W96-8M-007  8000000 2       7 (1)
00 50 f1 1f 08 TI-2W96-8M-008  8000000 2       8 (1)
---------------------------------------------------
Total Number:     32 RCP
```

The following example displays information for a specific RCP:

```
show cable rcp "00 10 18 80 61" verbose
```



```
admin@CableOS> show cable rcp "00 10 18 80 61" verbose

RCP-ID : 00 10 18 80 61
  Name : 3380-6M-8DS-001
  Center Frequency Spacing : 6000000
  Number of Modules : 2
    Module [1]:
      Number of Adjacent Channels: 5
      Minimum Center Frequency-Hz: 111000000
      Maximum Center Frequency-Hz: 999000000
    Module [2]:
      Number of Adjacent Channels: 5
      Minimum Center Frequency-Hz: 111000000
      Maximum Center Frequency-Hz: 999000000
  Number of Channels : 8
  Number of Primary Capable Channels : 1
    Channel[1]:
      Connectivity: 0x60 [1, 2]
      Primary Capable: True
    Channel[2]:
      Connectivity: 0x60 [1, 2]
      Primary Capable: False
    Channel[3]:
      Connectivity: 0x60 [1, 2]
      Primary Capable: False
    Channel[4]:
      Connectivity: 0x60 [1, 2]
      Primary Capable: False
    Channel[5]:
      Connectivity: 0x60 [1, 2]
      Primary Capable: False
    Channel[6]:
      Connectivity: 0x60 [1, 2]
      Primary Capable: False
    Channel[7]:
      Connectivity: 0x60 [1, 2]
      Primary Capable: False
    Channel[8]:
      Connectivity: 0x60 [1, 2]
      Primary Capable: False
```

Output columns

Field	Description
Name	A string representing the proprietary RCP
Center Frequency Spacing	Specifies the interval between center SC-QAM frequencies in a Receive Module
Module	The receive module ID
Number of Adjacent Channels	If the Receive Module corresponds to a block of adjacent channel center frequencies, this parameter provides the number of such channels in the block
Minimum Center Frequency-Hz	Minimum center frequency (MHz) of the first SC-QAM channel of the block
Maximum Center Frequency-Hz	Maximum center frequency (MHz) of the first SC-QAM channel of the block

Field	Description
Channel	The receive channel ID
Connectivity	Receive Channel Connectivity Capability
Primary Capable	Indicates if the channel is primary capable

Related information

cable rcp

cable mac-domain * rcp use-learned

cable mac-domain * rcp verbose

show cable reef chassis

Use the show cable reef chassis command to show information about the Reef chassis at a specific slot..

`show cable reef` *v-slot* `chassis [ verbose ]`

Syntax description

`v-slot`	See *CLI: Cable interface identifiers syntax* for more details.
`verbose`	Optional Use the verbose option to display detailed chassis information such as Reef Controller board firmware versions, Temperature, Power Supply Status, Front Panel and Fan Status and overall Status summary of all SLOT/RPD in the chassis

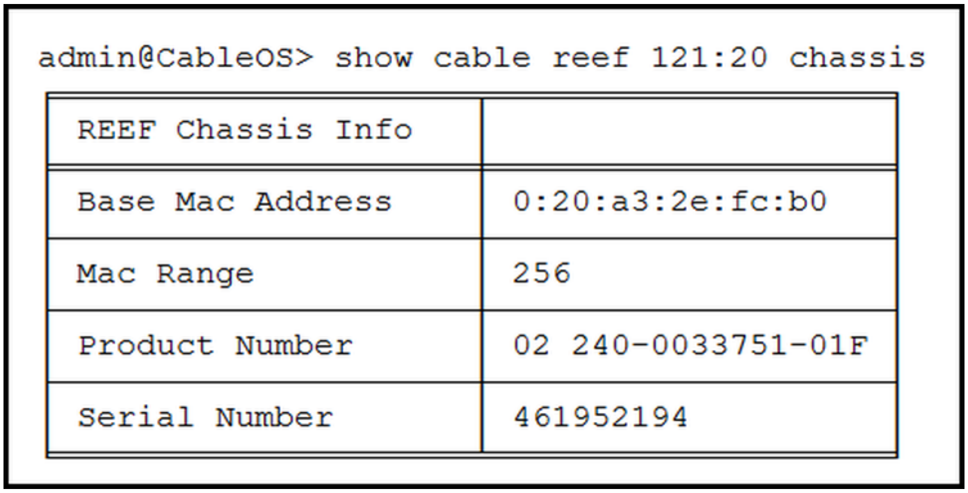
This command has no default value.

Command mode

Exec Mode

Examples

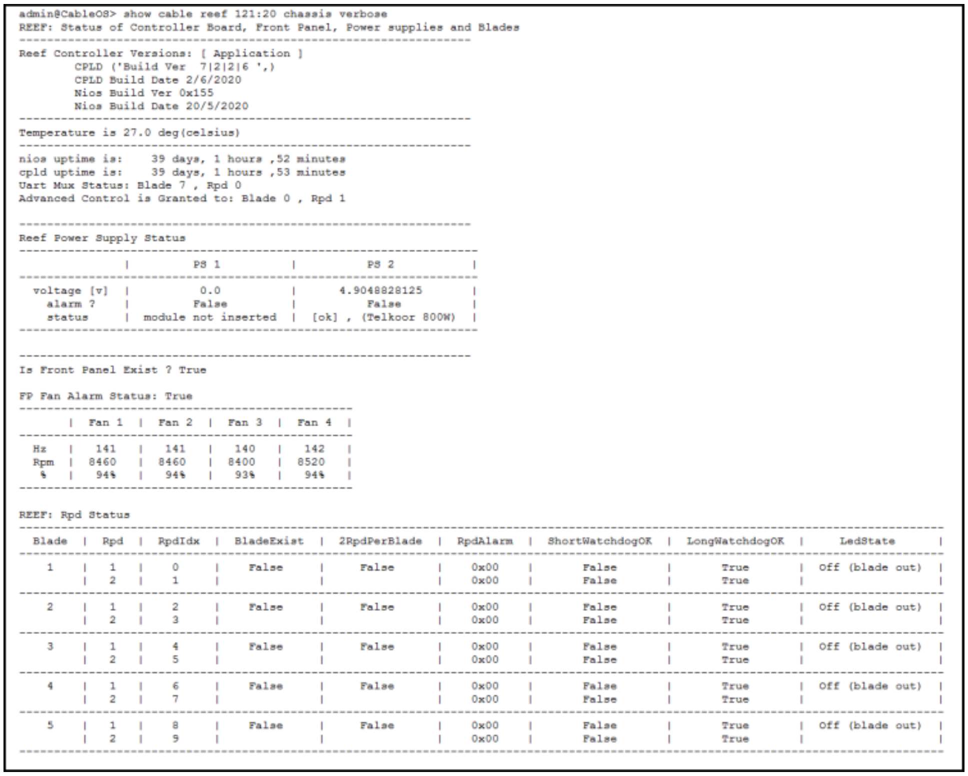
The following example shows general information.



```
admin@CableOS> show cable reef 121:20 chassis
```

REEF Chassis Info	
Base Mac Address	0:20:a3:2e:fc:b0
Mac Range	256
Product Number	02 240-0033751-01F
Serial Number	461952194

The following example shows detailed information.



```
admin@CableOS> show cable reef 121:20 chassis verbose
REEF: Status of Controller Board, Front Panel, Power supplies and Blades
----------------------------------------------------------------
Reef Controller Versions: [ Application ]
        CPLD ('Build Ver  7|2|2|6 ',)
        CPLD Build Date 2/6/2020
        Nios Build Ver 0x155
        Nios Build Date 20/5/2020
----------------------------------------------------------------
Temperature is 27.0 deg(celsius)
----------------------------------------------------------------
nios uptime is:    39 days, 1 hours ,52 minutes
cpld uptime is:    39 days, 1 hours ,53 minutes
Uart Mux Status: Blade 7 , Rpd 0
Advanced Control is Granted to: Blade 0 , Rpd 1

----------------------------------------------------------------
Reef Power Supply Status
-----------------------------------------------------------------
              |         PS 1          |          PS 2          |
-----------------------------------------------------------------
  voltage [v] |          0.0          |      4.9048828125      |
    alarm ?   |         False         |         False          |
    status    |  module not inserted  |  [ok] , (Telkoor 800W) |
-----------------------------------------------------------------

----------------------------------------------------------------
Is Front Panel Exist ? True

FP Fan Alarm Status: True
---------------------------------------------
      |  Fan 1  |  Fan 2  |  Fan 3  |  Fan 4  |
---------------------------------------------
  Hz  |   141   |   141   |   140   |   142   |
  Rpm |  8460   |  8460   |  8400   |  8520   |
   %  |   94%   |   94%   |   93%   |   94%   |
---------------------------------------------

REEF: Rpd Status
-------------------------------------------------------------------------------------------------------------------------------------
  Blade  |  Rpd  |  RpdIdx  |  BladeExist  |  2RpdPerBlade  |  RpdAlarm  |  ShortWatchdogOK  |  LongWatchdogOK  |     LedState      |
-------------------------------------------------------------------------------------------------------------------------------------
    1    |   1   |    0     |    False     |     False      |    0x00    |       False       |       True       | Off (blade out)   |
         |   2   |    1     |              |                |    0x00    |       False       |       True       |                   |
-------------------------------------------------------------------------------------------------------------------------------------
    2    |   1   |    2     |    False     |     False      |    0x00    |       False       |       True       | Off (blade out)   |
         |   2   |    3     |              |                |    0x00    |       False       |       True       |                   |
-------------------------------------------------------------------------------------------------------------------------------------
    3    |   1   |    4     |    False     |     False      |    0x00    |       False       |       True       | Off (blade out)   |
         |   2   |    5     |              |                |    0x00    |       False       |       True       |                   |
-------------------------------------------------------------------------------------------------------------------------------------
    4    |   1   |    6     |    False     |     False      |    0x00    |       False       |       True       | Off (blade out)   |
         |   2   |    7     |              |                |    0x00    |       False       |       True       |                   |
-------------------------------------------------------------------------------------------------------------------------------------
    5    |   1   |    8     |    False     |     False      |    0x00    |       False       |       True       | Off (blade out)   |
         |   2   |    9     |              |                |    0x00    |       False       |       True       |                   |
-------------------------------------------------------------------------------------------------------------------------------------
```

show cable remote-query cm

Use the `show cable remote-query cm` command to real-time poll a specific cable modem registered on the Core and display the polled RF parameters..

`show cable remote-query` `cm` { *ip-address* | *mac-address* }

Syntax description

ip-address	The IPv4 or IPv6 address of the specific CM to be displayed.
mac-address	The MAC address of the specific CM to be displayed.

Default

This command has no default value.

Command mode

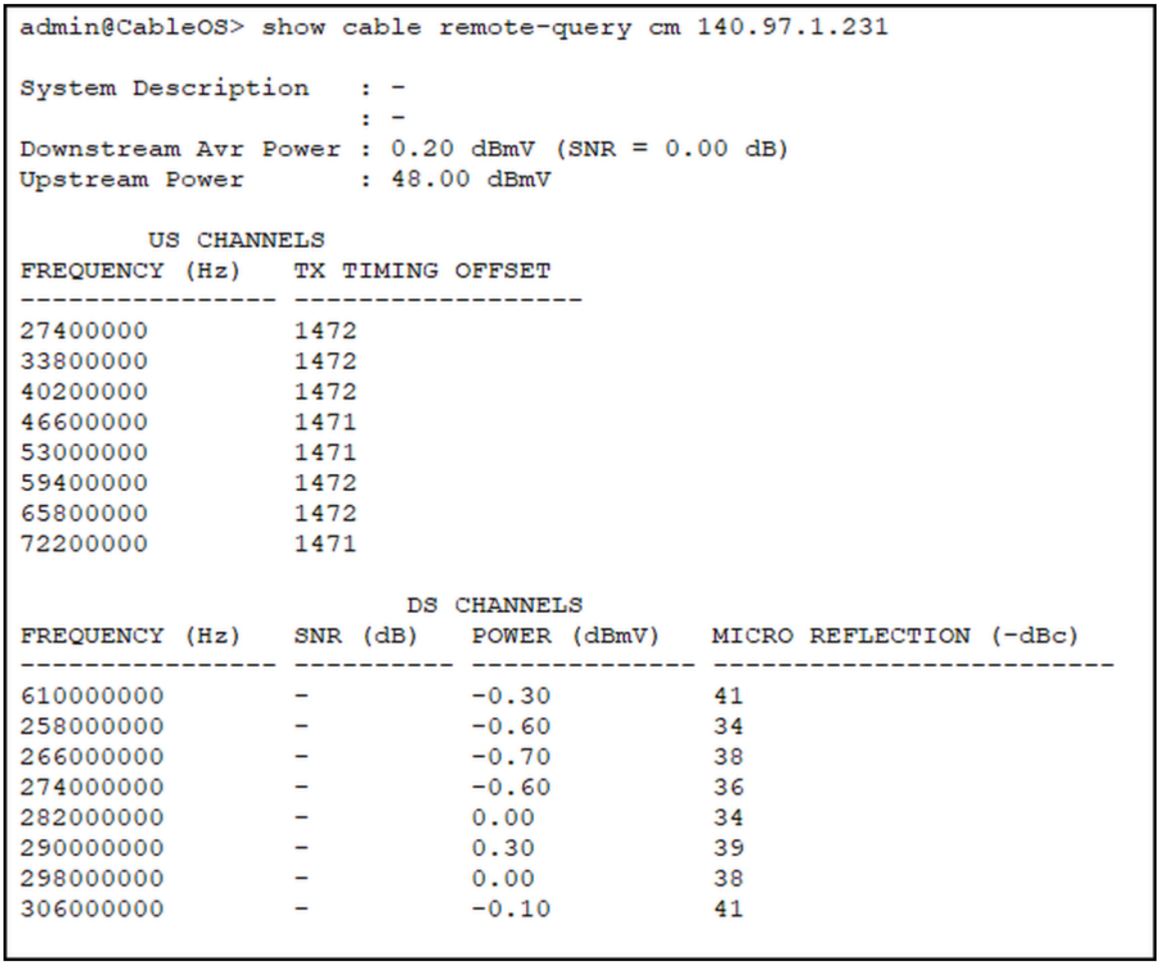
Exec mode

Usage guidelines

- To work with this command remote-query **MUST** be configured using the CLI config command `cable modem remote-query`. The `show cable remote-query cm` command uses the defined <SNMP

Community group name> to poll the modem. For example, defining `cable modem remote-query 300 public`, the string public would be used to poll the modem.

- If the `show cable remote-query cm` command could not receive some of the CM RF parameters for any reason (for example, due to an SNMP timeout), the output displays dash symbols ('-').



```
admin@CableOS> show cable remote-query cm 140.97.1.231

System Description   : -
                     : -
Downstream Avr Power : 0.20 dBmV (SNR = 0.00 dB)
Upstream Power       : 48.00 dBmV

        US CHANNELS
FREQUENCY (Hz)   TX TIMING OFFSET
---------------- ------------------
27400000         1472
33800000         1472
40200000         1472
46600000         1471
53000000         1471
59400000         1472
65800000         1472
72200000         1471

                        DS CHANNELS
FREQUENCY (Hz)   SNR (dB)   POWER (dBmV)   MICRO REFLECTION (-dBc)
---------------- ---------- -------------- -------------------------
610000000        -          -0.30          41
258000000        -          -0.60          34
266000000        -          -0.70          38
274000000        -          -0.60          36
282000000        -          0.00           34
290000000        -          0.30           39
298000000        -          0.00           38
306000000        -          -0.10          41
```

If this occurs, you should try the command again.

- The command timesout after 20 seconds.
- The command works only with online modems registered on the Core. If the CM is offline, the command displays an error message:

```
admin@CableOS> show cable remote-query cm 7456.122a.8de6
Impossible to execute CableOS Remote Query command because the CM is not
 online.
```

- If a CM that does not exist is polled, the command displays an error message:

```
admin@CableOS> show cable remote-query cm 7456.122a.8de9
Not Found
```

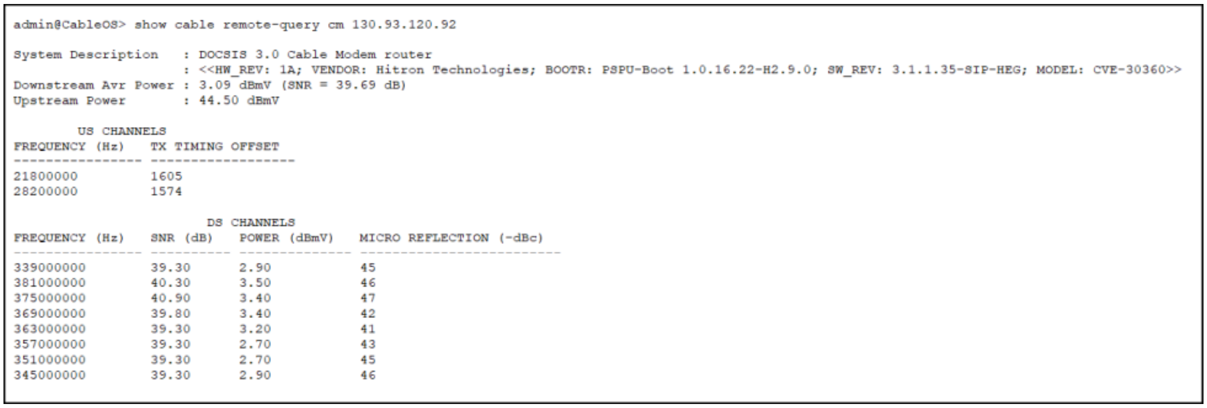
- If an existing CM is polled but it does not respond to SNMP requests, the command displays an error message:

```
admin@CableOS> show cable remote-query cm 7456.122a.8de9
Not Found
```

- When working with one of the containerised versions of CableOS, all public services MUST be configured, as shown in this example:

```
admin@CableOS> show running-config system public-services
system public-services ip-address 172.16.247.2
system public-services ip-gw-address 172.16.247.1/24
system public-services ipv6-address 2711:1004:247:6::2
system public-services ipv6-gw-address 2711:1004:247:6::1/120
system public-services vlan-id 3892
```

Examples



```
admin@CableOS> show cable remote-query cm 130.93.120.92

System Description    : DOCSIS 3.0 Cable Modem router
                      : <<HW_REV: 1A; VENDOR: Hitron Technologies; BOOTR: PSPU-Boot 1.0.16.22-H2.9.0; SW_REV: 3.1.1.35-SIP-HEG; MODEL: CVE-30360>>
Downstream Avr Power : 3.09 dBmV (SNR = 39.69 dB)
Upstream Power        : 44.50 dBmV

        US CHANNELS
FREQUENCY (Hz)    TX TIMING OFFSET
---------------- ------------------
21800000          1605
28200000          1574

                        DS CHANNELS
FREQUENCY (Hz)    SNR (dB)    POWER (dBmV)    MICRO REFLECTION (-dBc)
---------------- ---------- -------------- -------------------------
339000000         39.30       2.90            45
381000000         40.30       3.50            46
375000000         40.90       3.40            47
369000000         39.80       3.40            42
363000000         39.30       3.20            41
357000000         39.30       2.70            43
351000000         39.30       2.70            45
345000000         39.30       2.90            46
```

Output columns

Field	Description
System Description	A textual description of the CM, as reported by the CM. This value includes the full name and version identification of the system's hardware type, software operating-system, and networking software.
Downstream Avr Power	The channel average value of the downstream receive power level, in dBmV, and downstream signal-to-noise ratio, in dB.
Upstream Power	The operational transmit power for the attached upstream channel, in dBm, as reported by the CM. **NOTE:** In certain circumstances, this will be the maximal value of the following: • The CM TxPower docsIfCmStatusTxPower SNMP result • The CM ofdma channels docsIf31CmUsOfdmaChanTxPower SNMP result
FREQUENCY (Hz)	The center of the frequency associated with a channel, in Hz, as reported by the CM.
TX TIMING OFFSET	The timing offset for the CM, in ticks, as recognized on the CM. This is the delay between when a particular cable modem is scheduled to make a transmission and when the CMTS actually receives it. The CM value includes any internal delay between when the CM software begins the transmission and when the bits actually appear on the local cable interface.

Field	Description
	NOTE: The timing offset shown here is typically larger than the Time Offset value shown by the `show cable modem` command, because the latter value is the offset as recognized on the CMTS (which does not include the internal delay on the CM).
SNR (dB)	The downstream signal-to-noise ratio (SNR), in dB, as reported by the CM.
POWER (dBmV)	The received power level, in dBmV, as reported by the CM.
MICRO (-dBc) REFLECTION	The approximate number of total microreflections (including in-channel responses) on the downstream, measured in dBc below the signal level, as seen by the CM. Microreflections are a type of impairment that is caused by impedance mismatches between amplifiers, couples, cables, and other equipment in the cable plant. Microreflections create copies of a signal that arrive at the receiver with different amounts of delay and attenuation, generating inter-symbol interference (ISI) that can cause the receiver to improperly detect the amplitude and phase of the incoming signal.

Related information

cable modem remote-query

show cable rpd

Use the `show cable rpd` command to display general RPD monitoring information.

```
show cable rpd [ { v-slot | rpd-ip | rpd-mac } ] [ verbose ]
```

Syntax description

`v-slot`	See *CLI: Cable interface identifiers syntax* for more details.
`rpd-ip`	The IP address of a specific RPD.
`rpd-mac`	The MAC address of a specific RPD.
`verbose`	Displays detailed information.

Command mode

Exec mode.

Usage guidelines

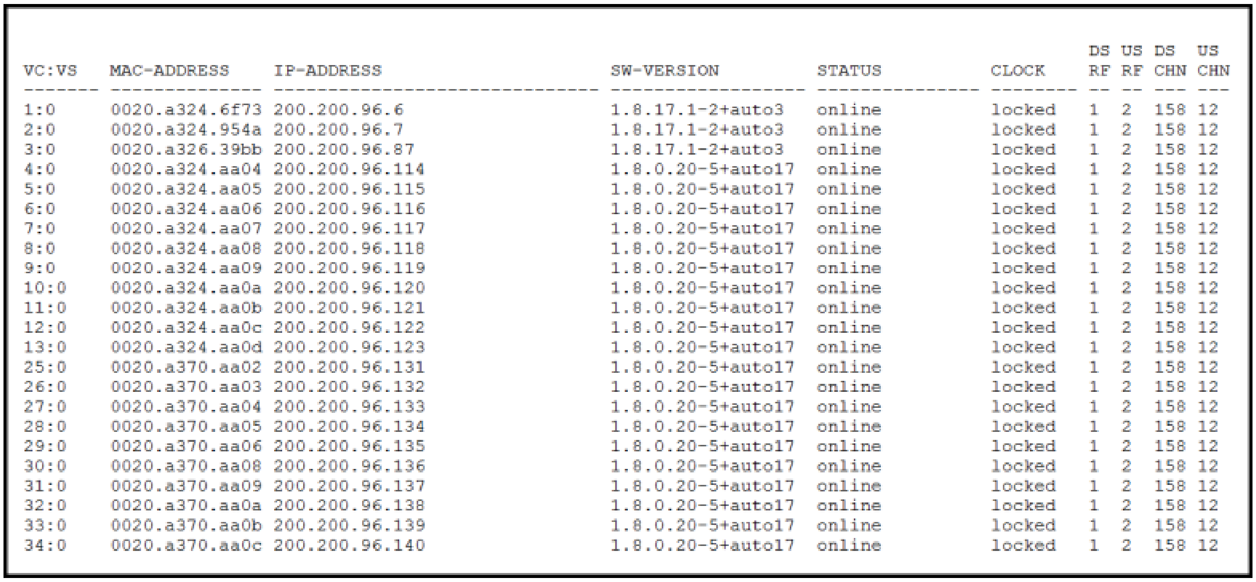
If no RPD ID is specified, a list of all RPDs will be displayed.

An RPD ID can be a MAC address, IPv4, IPv6 or RPD configuration ID (VC:VS, for example, 1:0).

Example

The following example displays general information for all RPDs:

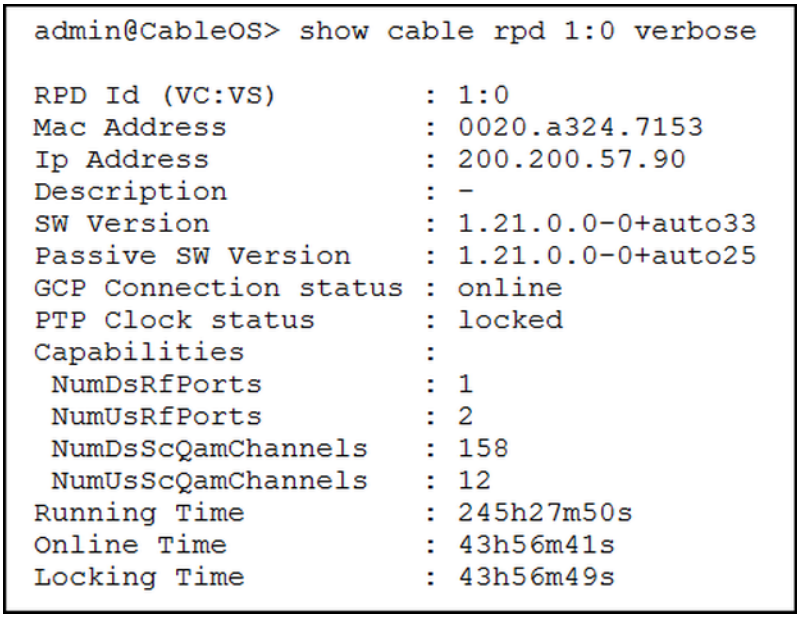
```
show cable rpd
```



```
                                                                                                  DS US DS  US
VC:VS   MAC-ADDRESS    IP-ADDRESS                     SW-VERSION         STATUS          CLOCK    RF RF CHN CHN
------- -------------- ------------------------------ ------------------ --------------- -------- -- -- --- ---
1:0     0020.a324.6f73 200.200.96.6                   1.8.17.1-2+auto3   online          locked   1  2  158 12
2:0     0020.a324.954a 200.200.96.7                   1.8.17.1-2+auto3   online          locked   1  2  158 12
3:0     0020.a326.39bb 200.200.96.87                  1.8.17.1-2+auto3   online          locked   1  2  158 12
4:0     0020.a324.aa04 200.200.96.114                 1.8.0.20-5+auto17  online          locked   1  2  158 12
5:0     0020.a324.aa05 200.200.96.115                 1.8.0.20-5+auto17  online          locked   1  2  158 12
6:0     0020.a324.aa06 200.200.96.116                 1.8.0.20-5+auto17  online          locked   1  2  158 12
7:0     0020.a324.aa07 200.200.96.117                 1.8.0.20-5+auto17  online          locked   1  2  158 12
8:0     0020.a324.aa08 200.200.96.118                 1.8.0.20-5+auto17  online          locked   1  2  158 12
9:0     0020.a324.aa09 200.200.96.119                 1.8.0.20-5+auto17  online          locked   1  2  158 12
10:0    0020.a324.aa0a 200.200.96.120                 1.8.0.20-5+auto17  online          locked   1  2  158 12
11:0    0020.a324.aa0b 200.200.96.121                 1.8.0.20-5+auto17  online          locked   1  2  158 12
12:0    0020.a324.aa0c 200.200.96.122                 1.8.0.20-5+auto17  online          locked   1  2  158 12
13:0    0020.a324.aa0d 200.200.96.123                 1.8.0.20-5+auto17  online          locked   1  2  158 12
25:0    0020.a370.aa02 200.200.96.131                 1.8.0.20-5+auto17  online          locked   1  2  158 12
26:0    0020.a370.aa03 200.200.96.132                 1.8.0.20-5+auto17  online          locked   1  2  158 12
27:0    0020.a370.aa04 200.200.96.133                 1.8.0.20-5+auto17  online          locked   1  2  158 12
28:0    0020.a370.aa05 200.200.96.134                 1.8.0.20-5+auto17  online          locked   1  2  158 12
29:0    0020.a370.aa06 200.200.96.135                 1.8.0.20-5+auto17  online          locked   1  2  158 12
30:0    0020.a370.aa08 200.200.96.136                 1.8.0.20-5+auto17  online          locked   1  2  158 12
31:0    0020.a370.aa09 200.200.96.137                 1.8.0.20-5+auto17  online          locked   1  2  158 12
32:0    0020.a370.aa0a 200.200.96.138                 1.8.0.20-5+auto17  online          locked   1  2  158 12
33:0    0020.a370.aa0b 200.200.96.139                 1.8.0.20-5+auto17  online          locked   1  2  158 12
34:0    0020.a370.aa0c 200.200.96.140                 1.8.0.20-5+auto17  online          locked   1  2  158 12
```

The following verbose example displays detailed information:

```
show cable rpd 200.200.96.6 verbose
```



```
admin@CableOS> show cable rpd 1:0 verbose

RPD Id (VC:VS)        : 1:0
Mac Address           : 0020.a324.7153
Ip Address            : 200.200.57.90
Description           : -
SW Version            : 1.21.0.0-0+auto33
Passive SW Version    : 1.21.0.0-0+auto25
GCP Connection status : online
PTP Clock status      : locked
Capabilities          :
 NumDsRfPorts         : 1
 NumUsRfPorts         : 2
 NumDsScQamChannels   : 158
 NumUsScQamChannels   : 12
Running Time          : 245h27m50s
Online Time           : 43h56m41s
Locking Time          : 43h56m49s
```

Output columns

Field	Description
VC:VS	Virtual Slot. Format: <0-99>:<0-99>
MAC-ADDRESS	The 48 bit MAC address of the RPD
IP-ADDRESS	IP Address of the RPD
SW-VERSION	The Remote PHY installed version
PASSIVE SW-VERSION	The Remote PHY installed version on the passive partition.
STATUS	RPD status: • offline: No RPD is connected • identify: Get RPD capabilities • configure: Configuration was sent to the DULC • online: RPD is configured and ready • identify-failed: Some mismatch between capabilities and configuration • configure-failed: Configuration NACK
CLOCK	The clock synchronization state of the R-PHY. Can be locked or unlocked
DS RF	Number of DS port capabilities in the RPD
US RF	Number of US port capabilities in the RPD
DS CHN	Number of DS Channel capabilities in the RPD
US CHN	Number of US Channel capabilities in the RPD

Related information

show cable rpd counters
show cable rpd * ptp
show cable rpd session
show cable rpd video-channel

show cable rpd counters

Use the `show cable rpd counters` command to display hardware counters for specific functions, such as downstream, upstream, and maps.

`show cable rpd` *v-slot* `counters` *function* [*rf-port-identifier*] [*physical-channel*]

Syntax description

v-slot	See *CLI: Cable interface identifiers syntax* for more details.

function	The function for which you want to display counters: • upstream • downstream • maps • oob downstream • oob upstream • ofdma-upstream • ofdma-map
rf-port-identifier	The identifier of the rf-port. Any integer between 0 - 11. The default value is 0. **NOTE:** This variable is not valid for `oob downstream` or `oob upstream`.
physical-channel	The OFDMA channel index. Valid values are 0 and 1. The default value is 0. **NOTE:** This variable is only valid for `ofdma-upstream`.

Command mode

Exec mode.

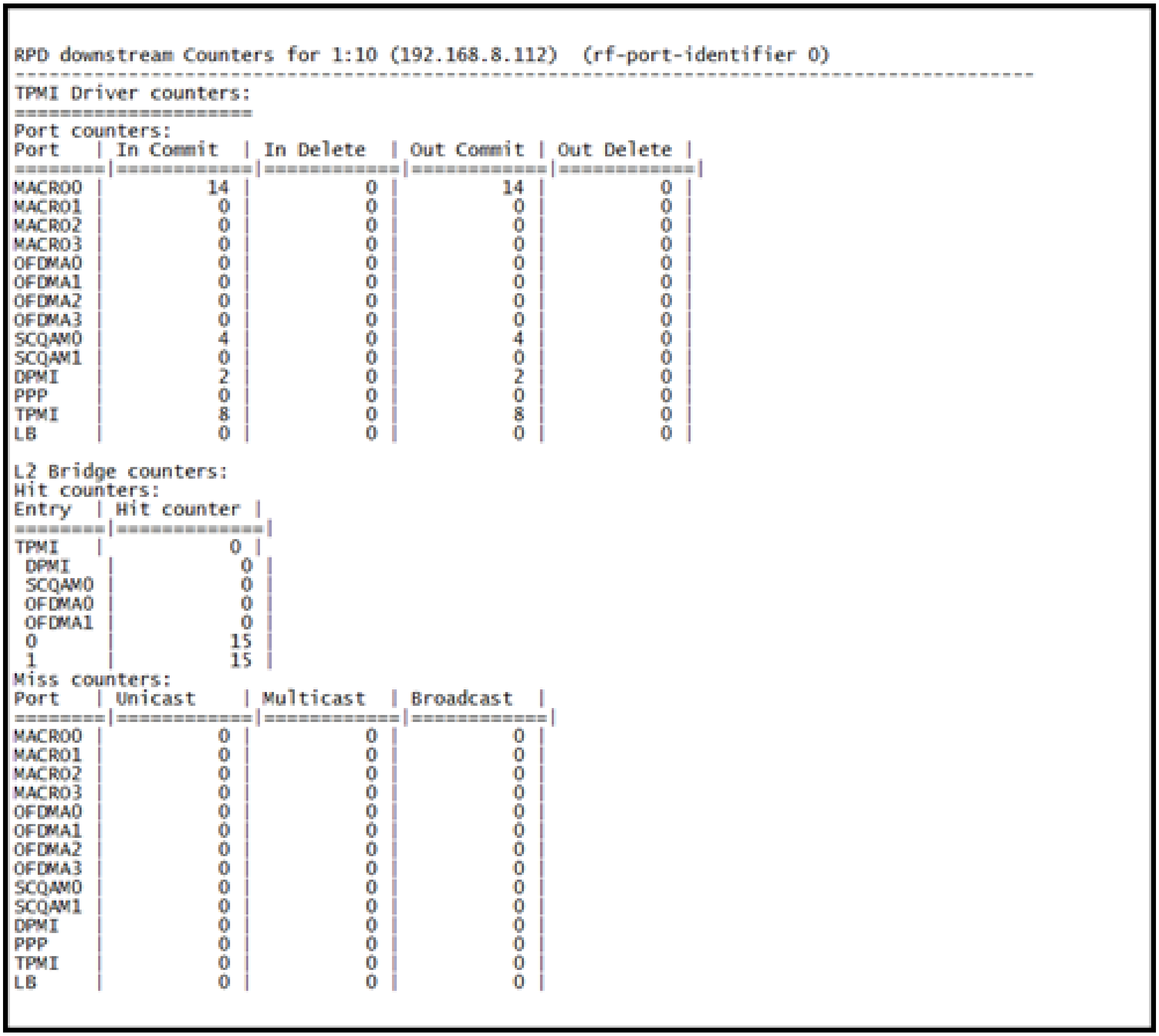
Usage guidelines

The output display values are cleared and fresh values are retrieved every 40 seconds.

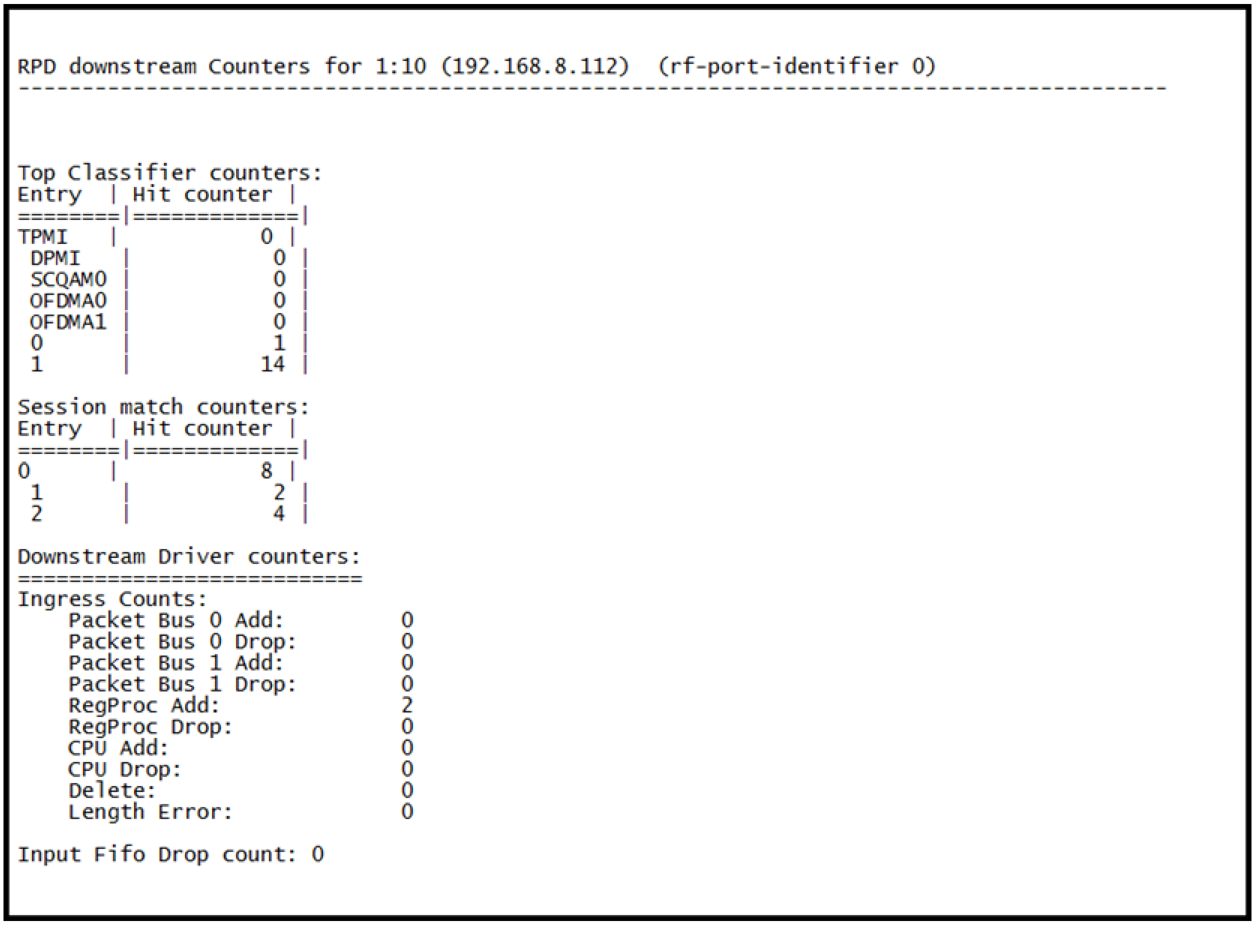
Examples

The following example will display all downstream counters for rf-port 0:

```
show cable rpd 1:10 counters downstream 0
```



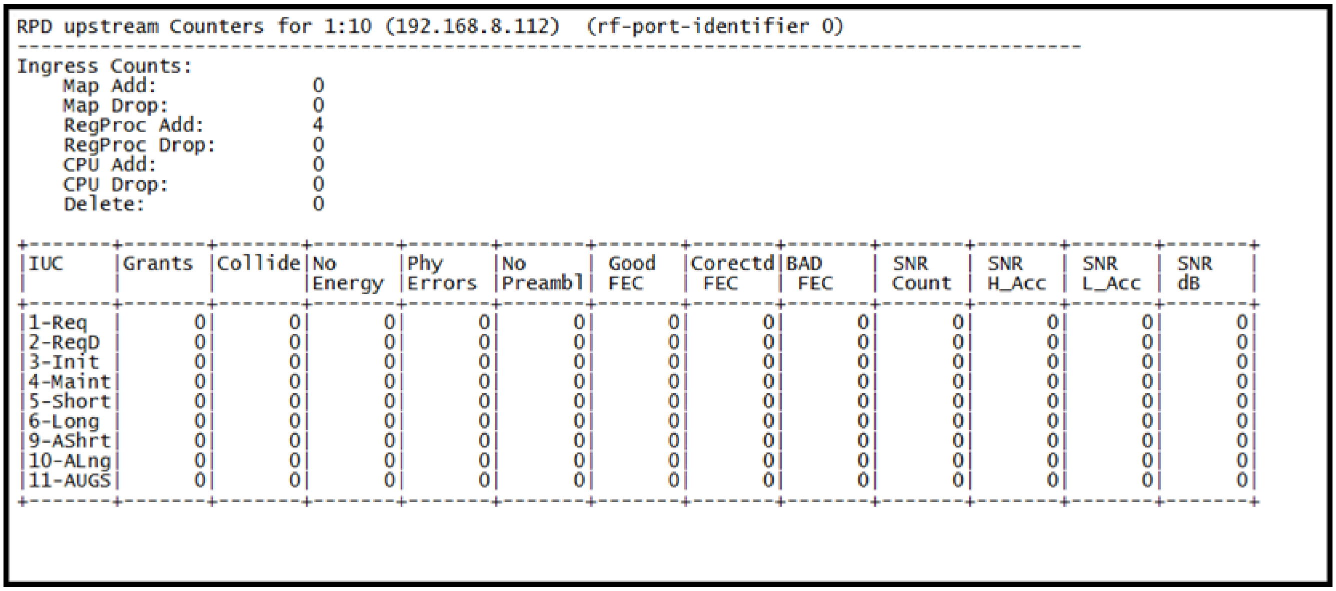
```
RPD downstream Counters for 1:10 (192.168.8.112)  (rf-port-identifier 0)
------------------------------------------------------------------------------------------
TPMI Driver counters:
=====================
Port counters:
Port     | In Commit   | In Delete   | Out Commit  | Out Delete |
========|============|============|============|============|
MACRO0  |         14 |          0 |         14 |          0 |
MACRO1  |          0 |          0 |          0 |          0 |
MACRO2  |          0 |          0 |          0 |          0 |
MACRO3  |          0 |          0 |          0 |          0 |
OFDMA0  |          0 |          0 |          0 |          0 |
OFDMA1  |          0 |          0 |          0 |          0 |
OFDMA2  |          0 |          0 |          0 |          0 |
OFDMA3  |          0 |          0 |          0 |          0 |
SCQAM0  |          4 |          0 |          4 |          0 |
SCQAM1  |          0 |          0 |          0 |          0 |
DPMI    |          2 |          0 |          2 |          0 |
PPP     |          0 |          0 |          0 |          0 |
TPMI    |          8 |          0 |          8 |          0 |
LB      |          0 |          0 |          0 |          0 |

L2 Bridge counters:
Hit counters:
Entry   | Hit counter |
========|=============|
TPMI    |           0 |
 DPMI    |           0 |
 SCQAM0  |           0 |
 OFDMA0  |           0 |
 OFDMA1  |           0 |
 0       |          15 |
 1       |          15 |
Miss counters:
Port    | Unicast    | Multicast  | Broadcast  |
========|============|============|============|
MACRO0  |          0 |          0 |          0 |
MACRO1  |          0 |          0 |          0 |
MACRO2  |          0 |          0 |          0 |
MACRO3  |          0 |          0 |          0 |
OFDMA0  |          0 |          0 |          0 |
OFDMA1  |          0 |          0 |          0 |
OFDMA2  |          0 |          0 |          0 |
OFDMA3  |          0 |          0 |          0 |
SCQAM0  |          0 |          0 |          0 |
SCQAM1  |          0 |          0 |          0 |
DPMI    |          0 |          0 |          0 |
PPP     |          0 |          0 |          0 |
TPMI    |          0 |          0 |          0 |
LB      |          0 |          0 |          0 |
```



```
RPD downstream Counters for 1:10 (192.168.8.112)  (rf-port-identifier 0)
------------------------------------------------------------------------------------------


Top Classifier counters:
Entry  | Hit counter |
========|=============|
TPMI   |           0 |
 DPMI   |            0 |
 SCQAM0 |            0 |
 OFDMA0 |            0 |
 OFDMA1 |            0 |
 0      |            1 |
 1      |           14 |

Session match counters:
Entry  | Hit counter |
========|=============|
0      |           8 |
 1      |            2 |
 2      |            4 |

Downstream Driver counters:
===========================
Ingress Counts:
    Packet Bus 0 Add:          0
    Packet Bus 0 Drop:         0
    Packet Bus 1 Add:          0
    Packet Bus 1 Drop:         0
    RegProc Add:               2
    RegProc Drop:              0
    CPU Add:                   0
    CPU Drop:                  0
    Delete:                    0
    Length Error:              0

Input Fifo Drop count: 0
```

The following example will display all upstream counters for rf-port 0:

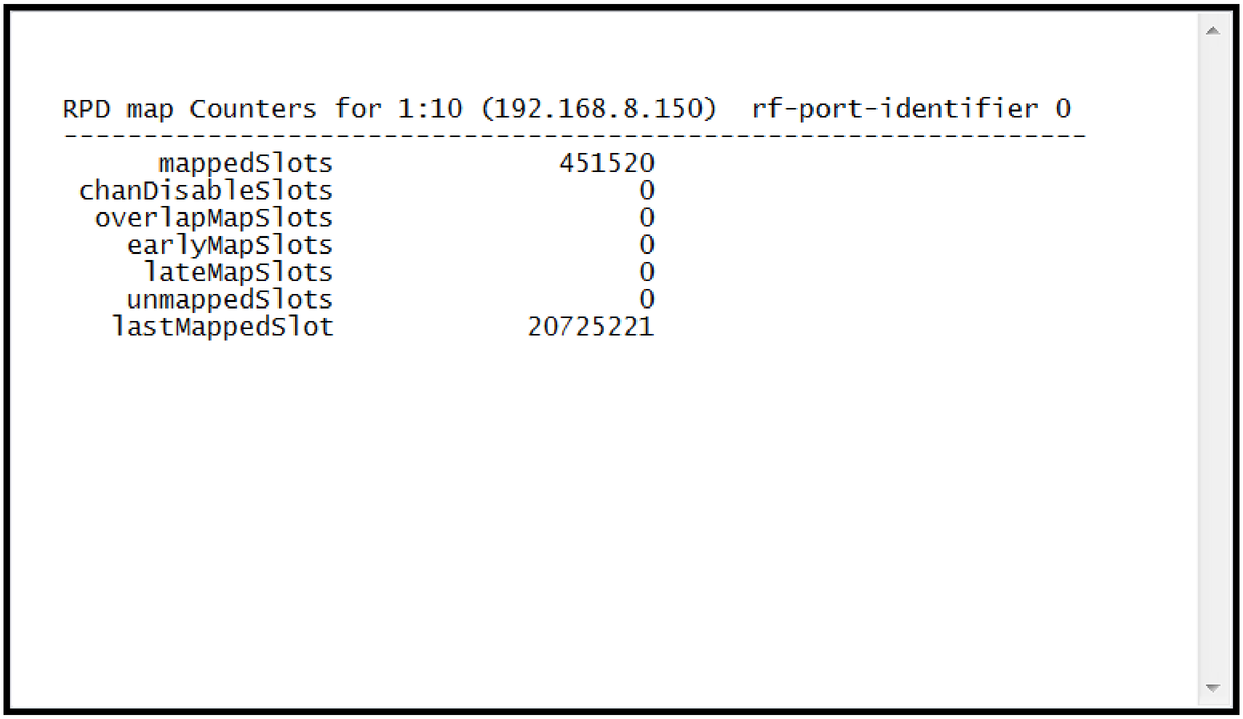
```
show cable rpd 1:10 counters upstream 0
```



```
RPD upstream Counters for 1:10 (192.168.8.112)  (rf-port-identifier 0)
-------------------------------------------------------------------------------------------
Ingress Counts:
    Map Add:             0
    Map Drop:            0
    RegProc Add:         4
    RegProc Drop:        0
    CPU Add:             0
    CPU Drop:            0
    Delete:              0

+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+
|IUC    |Grants |Collide|No     |Phy    |No     | Good  |Corectd|BAD    | SNR   | SNR   | SNR   | SNR   |
|       |       |       |Energy |Errors |Preambl| FEC   | FEC   | FEC   | Count | H_Acc | L_Acc | dB    |
+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+
|1-Req  |      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|
|2-ReqD |      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|
|3-Init |      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|
|4-Maint|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|
|5-Short|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|
|6-Long |      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|
|9-AShrt|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|
|10-ALng|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|
|11-AUGS|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|      0|
+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+-------+
```

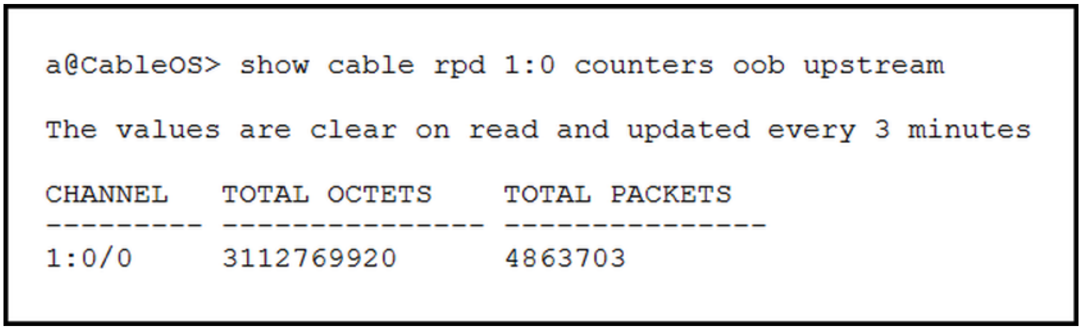
The following example will display all map counters for rf-port 0:

```
show cable rpd 1:10 counters map 0
```



```
RPD map Counters for 1:10 (192.168.8.150)  rf-port-identifier 0
---------------------------------------------------------------
      mappedSlots              451520
 chanDisableSlots                   0
  overlapMapSlots                   0
    earlyMapSlots                   0
     lateMapSlots                   0
    unmappedSlots                   0
   lastMappedSlot            20725221
```

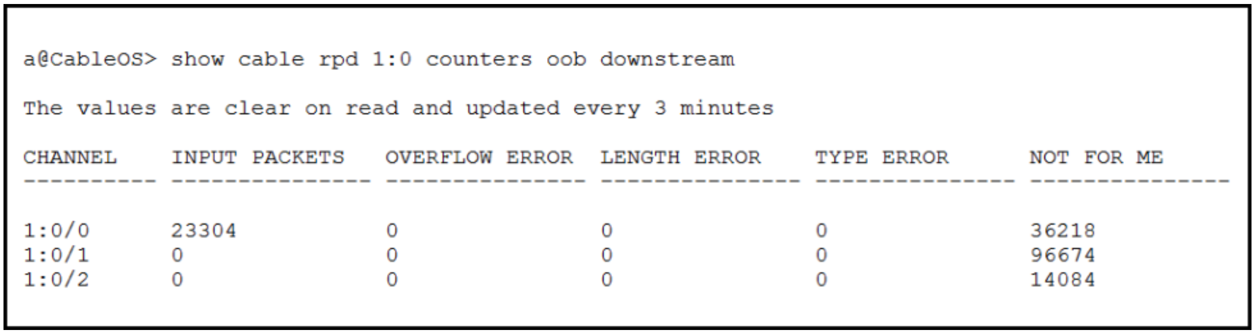
The following example shows counters for oob upstream:



```
a@CableOS> show cable rpd 1:0 counters oob upstream

The values are clear on read and updated every 3 minutes

CHANNEL    TOTAL OCTETS     TOTAL PACKETS
---------- ---------------- ----------------
1:0/0      3112769920       4863703
```

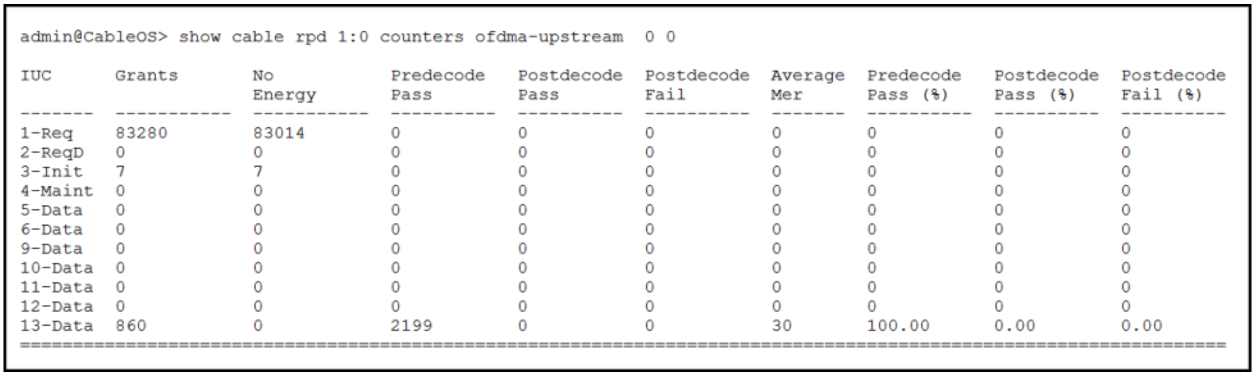
The following example shows counters for oob downstream:

The `NOT FOR ME` column displays the number of non-oob packets.



```
a@CableOS> show cable rpd 1:0 counters oob downstream

The values are clear on read and updated every 3 minutes

CHANNEL    INPUT PACKETS   OVERFLOW ERROR  LENGTH ERROR    TYPE ERROR      NOT FOR ME
---------- --------------- --------------- --------------- --------------- ---------------

1:0/0      23304           0               0               0               36218
1:0/1      0               0               0               0               96674
1:0/2      0               0               0               0               14084
```

The following example shows counters for OFDMA upstream:



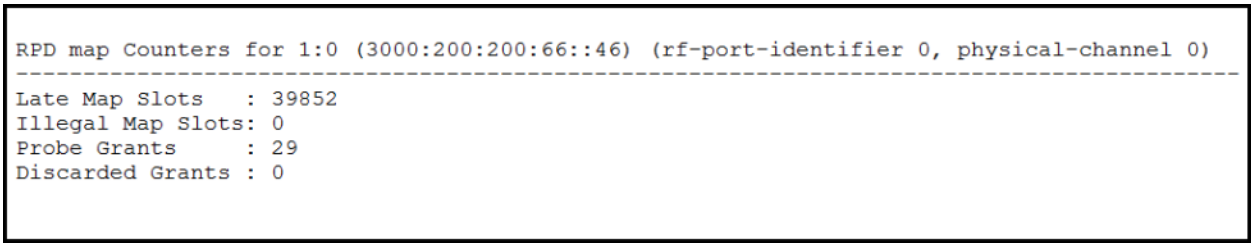
```
admin@CableOS> show cable rpd 1:0 counters ofdma-upstream  0 0

IUC      Grants       No           Predecode  Postdecode Postdecode Average Predecode  Postdecode Postdecode
                      Energy       Pass       Pass       Fail       Mer     Pass (%)   Pass (%)   Fail (%)
-------  -----------  -----------  ---------- ---------- ---------- ------- ---------- ---------- ----------
1-Req    83280        83014        0          0          0          0       0          0          0
2-ReqD   0            0            0          0          0          0       0          0          0
3-Init   7            7            0          0          0          0       0          0          0
4-Maint  0            0            0          0          0          0       0          0          0
5-Data   0            0            0          0          0          0       0          0          0
6-Data   0            0            0          0          0          0       0          0          0
9-Data   0            0            0          0          0          0       0          0          0
10-Data  0            0            0          0          0          0       0          0          0
11-Data  0            0            0          0          0          0       0          0          0
12-Data  0            0            0          0          0          0       0          0          0
13-Data  860          0            2199       0          0          30      100.00     0.00       0.00
===========================================================================================================
```

Table 4-1: Output Columns

Field	Description
IUC	IUC for which the statistical counters are read.
Grants	The number of scheduled grants for the specified IUC.
No Energy	The number of bursts with no energy detected for the specified IUC.

Field	Description
Predecode Pass	The number of LDPC codewords for the selected IUC that passed pre-decode syndrome check.
Postdecode Pass	The number of LDPC codewords for the selected IUC that passed post-decode syndrome check.
Postdecode Fail	The number of received LDPC codewords for the selected IUC that failed post-decode syndrome check.
Average MER	The average MER for the selected IUC. The units are tenth Db.
Predecode Pass (%)	
Postdecode Pass (%)	
Postdecode Fail (%)	

The following example shows counters for OFDMA upstream. Standard TLV 79 - UsOfdmaChannelPerf is used to gather and transport these counters by GCP.



```
RPD map Counters for 1:0 (3000:200:200:66::46) (rf-port-identifier 0, physical-channel 0)
-------------------------------------------------------------------------------------------
Late Map Slots   : 39852
Illegal Map Slots: 0
Probe Grants     : 29
Discarded Grants : 0
```

Table 4-2: Output Columns

Field	Description
Late Map Slots	The number of minislots discarded due to late receive.
Illegal Map Slots	The number of MAP messages with detected errors, other than late error for the selected channel.
Probe Grants	The number of Probe Grants on the channel.

Field	Description
Discarded Grants	The number of bandwidth requests that were discarded by the RPD for the selected channel.

Related information

show cable rpd

show cable rpd * ptp

show cable rpd session

show cable rpd video-channel

show cable rpd description

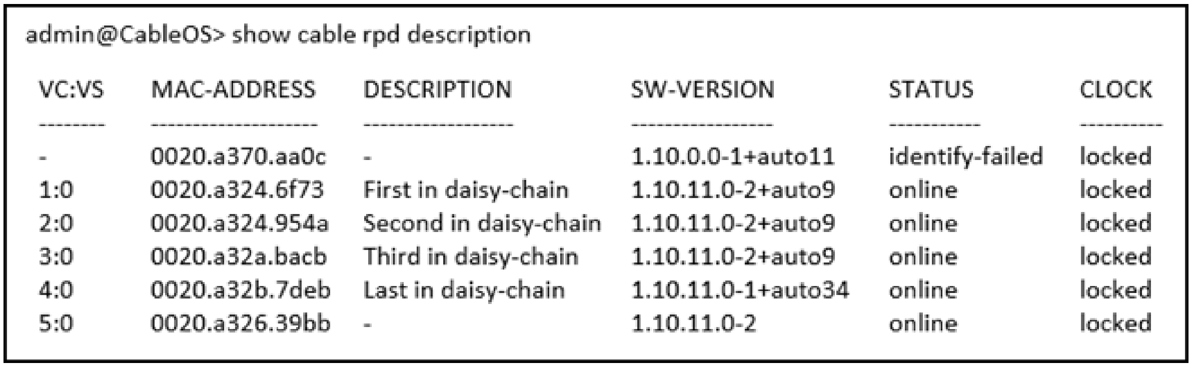
Use the `show cable rpd description` command to display RPD information including written descriptions.

```
show cable rpd description
```

Command mode

Exec mode.

Example



```
admin@CableOS> show cable rpd description

 VC:VS     MAC-ADDRESS        DESCRIPTION            SW-VERSION           STATUS            CLOCK
 --------  -----------------  ---------------------  -------------------  ----------------  ----------
 -         0020.a370.aa0c     -                      1.10.0.0-1+auto11    identify-failed   locked
 1:0       0020.a324.6f73     First in daisy-chain   1.10.11.0-2+auto9    online            locked
 2:0       0020.a324.954a     Second in daisy-chain  1.10.11.0-2+auto9    online            locked
 3:0       0020.a32a.bacb     Third in daisy-chain   1.10.11.0-2+auto9    online            locked
 4:0       0020.a32b.7deb     Last in daisy-chain    1.10.11.0-1+auto34   online            locked
 5:0       0020.a326.39bb     -                      1.10.11.0-2          online            locked
```

Output columns

Field	Description
VC:VS	Virtual Slot. Format: <0-99>:<0-99>
MAC-ADDRESS	The 48 bit MAC address of the RPD
DESCRIPTION	RPD information
SW-VERSION	The Remote PHY installed version
STATUS	RPD status:

Field	Description
	• offline: No RPD is connected • identify: Get RPD capabilities • configure: Configuration was sent to the DULC • online: RPD is configured and ready • identify-failed: Some mismatch between capabilities and configuration • configure-failed: Configuration NACK
CLOCK	The clock synchronization state of the R-PHY. Can be locked or unlocked

show cable rpd environment

Use the `show cable rpd environment` command to show information about temperature and voltage sensors for RPDs.

`show cable rpd` { *v-slot* | *rpd-ip* | *rpd-mac* } `environment` [`temperature` | `voltage`]

Syntax description

v-slot	See *CLI: Cable interface identifiers syntax* for more details.
rpd-ip	The IPv4 or IPv6 address of a specific RPD.
rpd-mac	The MAC address of a specific RPD.

Default

This command has no default value.

Command mode

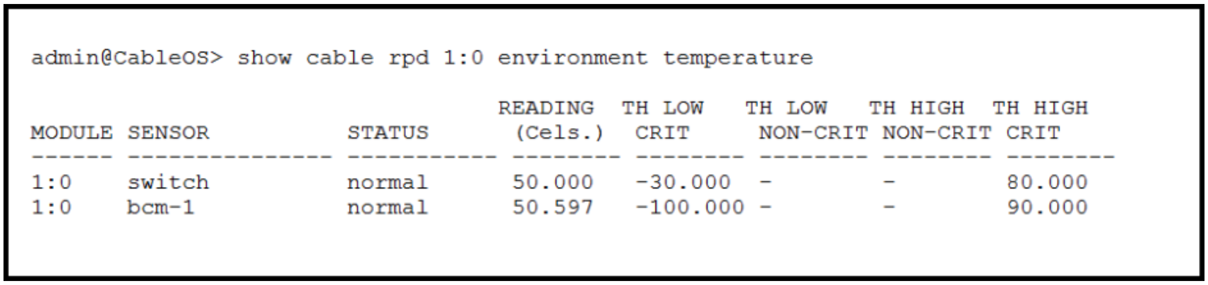
Exec mode.

Usage guidelines

Equivalent to the `show environment cable rpd` command.

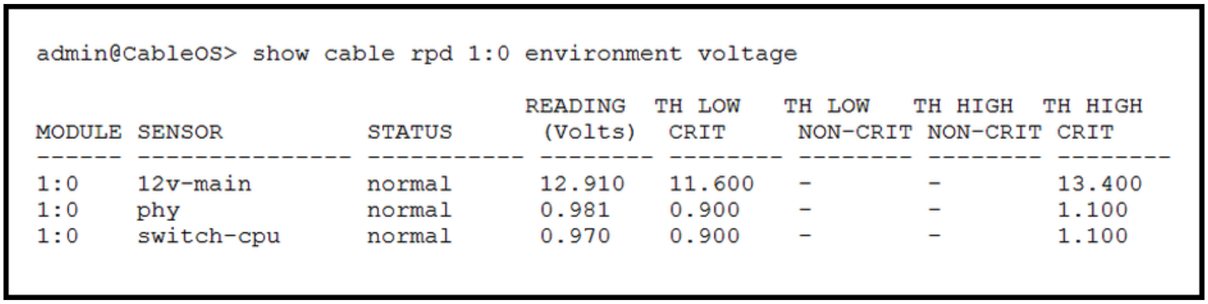
Examples

The example below shows the output for the RPD at node 1:0 for temperature



```
admin@CableOS> show cable rpd 1:0 environment temperature

                                  READING  TH LOW   TH LOW   TH HIGH  TH HIGH
MODULE SENSOR           STATUS      (Cels.)  CRIT     NON-CRIT NON-CRIT CRIT
------ ---------------- ----------- --------- --------- --------- --------- ---------
1:0    switch           normal      50.000    -30.000   -        -        80.000
1:0    bcm-1            normal      50.597    -100.000 -        -        90.000
```

The example below shows the output for the RPD at node 1:0 for voltage



```
admin@CableOS> show cable rpd 1:0 environment voltage

                                  READING  TH LOW   TH LOW   TH HIGH  TH HIGH
MODULE SENSOR          STATUS      (Volts)  CRIT      NON-CRIT NON-CRIT CRIT
------ --------------- ----------- -------- -------- -------- -------- --------
1:0    12v-main        normal      12.910   11.600   -        -        13.400
1:0    phy             normal      0.981    0.900    -        -        1.100
1:0    switch-cpu      normal      0.970    0.900    -        -        1.100
```

Output columns for Temperature

Field	**Description**
Sensor	Name of the temperature sensor
Status	Status of the sensor. Possible options are: • Normal • Warning • Critical • Not present
Reading	Sensor voltage.
TH Low CRIT	The Low Threshold is critical. Below this value, the system may fail (critical state)
TH Low NON-CRIT	Low Non-Critical Threshold. The temperature is close to the Critical Threshold (warning state)
TH High NON-CRIT	High Non-Critical Threshold. The temperature is close to the Critical Threshold (warning state)
TH High CRIT	The High Threshold is critical. Above this value, the system may fail (critical state)

Output columns for Voltage

Field	**Description**
Sensor	Name of the voltage sensor
Status	Status of the sensor. Possible options are: • Normal • Warning • Critical • Not present
Reading	Sensor voltage.
TH Low CRIT	The Low Threshold is critical. Below this value, the system may fail (critical state)

Field	Description
TH Low NON-CRIT	Low Non-Critical Threshold. The voltage is close to the Critical Threshold (warning state)
TH High NON-CRIT	High Non-Critical Threshold. The voltage is close to the Critical Threshold (warning state)
TH High CRIT	The High Threshold is critical. Above this value, the system may fail (critical state)

show cable rpd identify-failed

Use the `show cable rpd identify-failed` command to display RPD monitoring for an identify-failed state.

```
show cable rpd identify-failed
```

Command mode

Exec mode.

Usage guidelines

An RPD in an identify-failed state is a connected RPD that does not have a corresponding RPD configuration with the same MAC address.

Example

```
0         1         2         3         4         5         6         7
01234567890123456789012345678901234567890123456789012345678901234567890123456789
CableOS> show cable rpd identify-failed
     FAIL                              CHASSIS
SLOT REASON           IP ADDRESS          NAME              VENDOR     MODEL
---- ---------------- ------------------- ----------------- ---------- ----------
1:2  chassis-name-mis xxx.xxx.xxx.xxx     xxxxxxxxxxxxxxxx harmonic   80G12
```

Output columns

SLOT	The slot the RPD is attached to
FAIL REASON	Reason for failure. One of: • chassis-name-mismatch: Configured chassis name does not match the RPD • vendor-mismatch: Configured vendor does not match the RPD • model-mismatch: Configured model does not match the RPD • slot-id-missing: RPD Slot is not configured
IP ADDRESS	IP Address of the RPD
CHASSIS NAME	Chassis name of the RPD

VENDOR	RPD vendor (Currently Harmonic only)
MODEL	RPD device model (80G12 or Pebble)

show cable rpd mtu

Use the `show cable rpd mtu` command to display the MTU of the RPD's Linux interfaces.

`show cable rpd mtu`

Syntax description

This command has no arguments or keywords.

Default

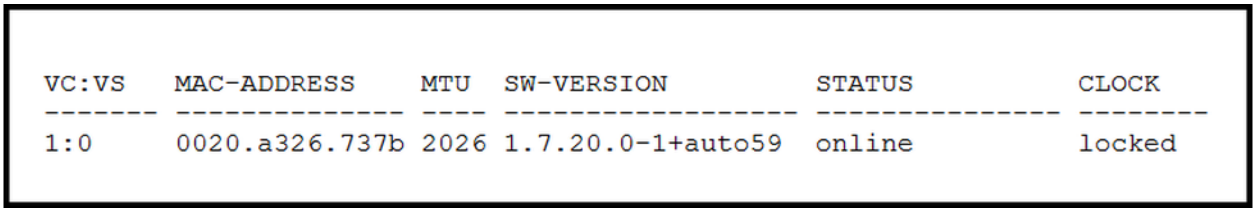
This command has no default value.

Command mode

Exec mode.

Example

The following example shows the output of a `show cable rpd mtu` command:



```
VC:VS   MAC-ADDRESS    MTU  SW-VERSION         STATUS          CLOCK
------- -------------- ---- ------------------ --------------- --------
1:0     0020.a326.737b 2026 1.7.20.0-1+auto59  online          locked
```

show cable rpd ndfr

Use the `show cable rpd ndfr` command to display monitoring statistics for NDFR.

`show cable rpd` *v-slot* `ndfr { status | clear-alarms | input-bitrate | output-bitrate }`

Syntax description

v-slot	See *CLI: Cable interface identifiers syntax* for more details.
`status`	Shows all the RPDs that are connected to the NDFR and their status.
`clear-alarms`	Clears the underflow bits in each channel that is configured.
`input-bitrate`	Shows the input bitrate.

`output-bitrate`	Shows the output bitrate.

Default

This command has no default value.

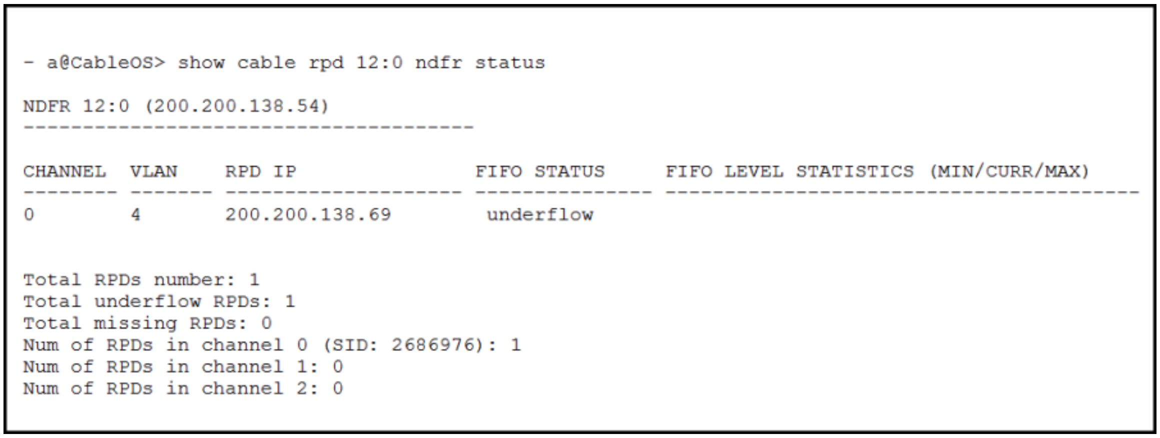
Command mode

EXEC mode

Examples

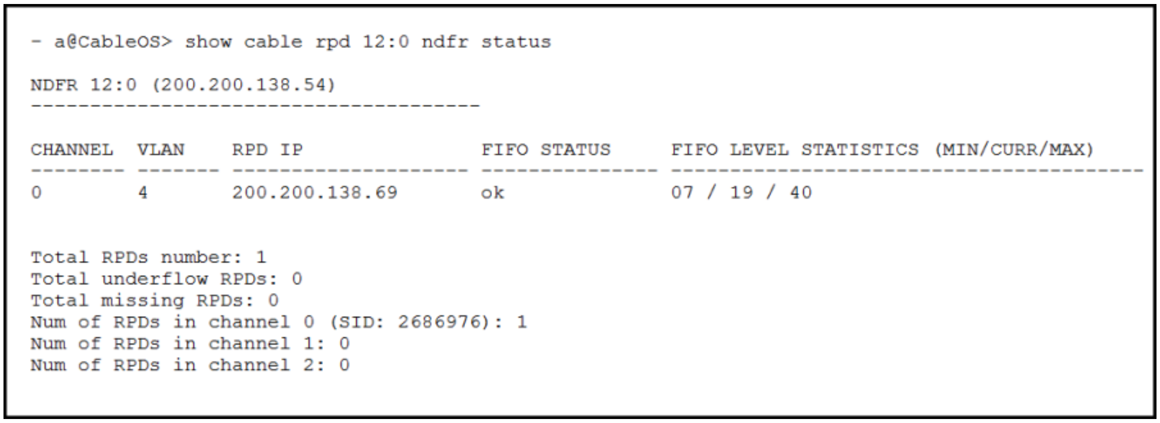
When the underflow bit is up but there is still jitter (shows that something is still alive), gets FIFO STATUS: underflow. After rebooting, the RPD will get underflow until `clear-alarms` is performed to clear the underflow status and then the real state of the RPD is received.

NOTE: "SID" is the L2TP session ID



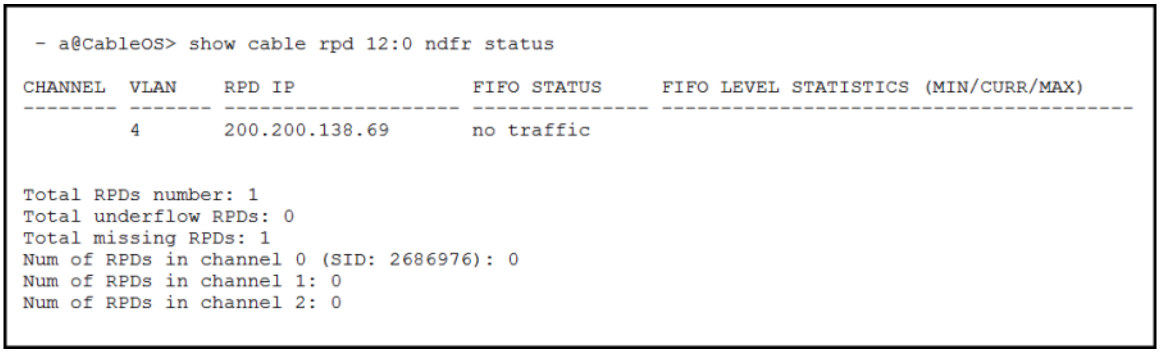
```
- a@CableOS> show cable rpd 12:0 ndfr status

NDFR 12:0 (200.200.138.54)
--------------------------------------

CHANNEL  VLAN    RPD IP               FIFO STATUS     FIFO LEVEL STATISTICS (MIN/CURR/MAX)
-------- ------- -------------------- --------------- ----------------------------------------
0        4       200.200.138.69        underflow


Total RPDs number: 1
Total underflow RPDs: 1
Total missing RPDs: 0
Num of RPDs in channel 0 (SID: 2686976): 1
Num of RPDs in channel 1: 0
Num of RPDs in channel 2: 0
```

When the underflow bit is off and the RPD has a VLAN, we will get FIFO STATUS: ok and the FIFO buffer measures.



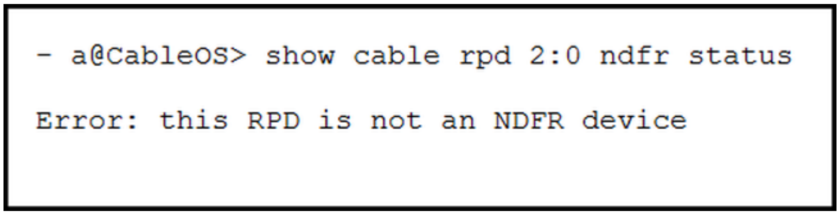
```
- a@CableOS> show cable rpd 12:0 ndfr status

NDFR 12:0 (200.200.138.54)
--------------------------------------

CHANNEL  VLAN    RPD IP               FIFO STATUS     FIFO LEVEL STATISTICS (MIN/CURR/MAX)
-------- ------- -------------------- --------------- ----------------------------------------
0        4       200.200.138.69       ok              07 / 19 / 40


Total RPDs number: 1
Total underflow RPDs: 0
Total missing RPDs: 0
Num of RPDs in channel 0 (SID: 2686976): 1
Num of RPDs in channel 1: 0
Num of RPDs in channel 2: 0
```

When the underflow bit is up and there is no current jitter (for example the RPD went to reboot and it takes about 15 minutes to update the l2tp table and to delete these RPD entries) , we will get FIFO STATUS: no traffic.



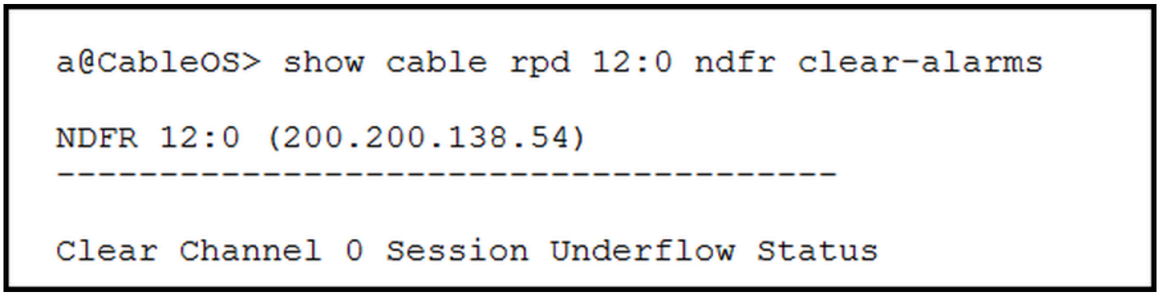
```
 - a@CableOS> show cable rpd 12:0 ndfr status

CHANNEL  VLAN    RPD IP               FIFO STATUS     FIFO LEVEL STATISTICS (MIN/CURR/MAX)
-------- ------- -------------------- --------------- ----------------------------------------
         4       200.200.138.69       no traffic


Total RPDs number: 1
Total underflow RPDs: 0
Total missing RPDs: 1
Num of RPDs in channel 0 (SID: 2686976): 0
Num of RPDs in channel 1: 0
Num of RPDs in channel 2: 0
```

If the command is run on a non-NDFR device, a message is received:



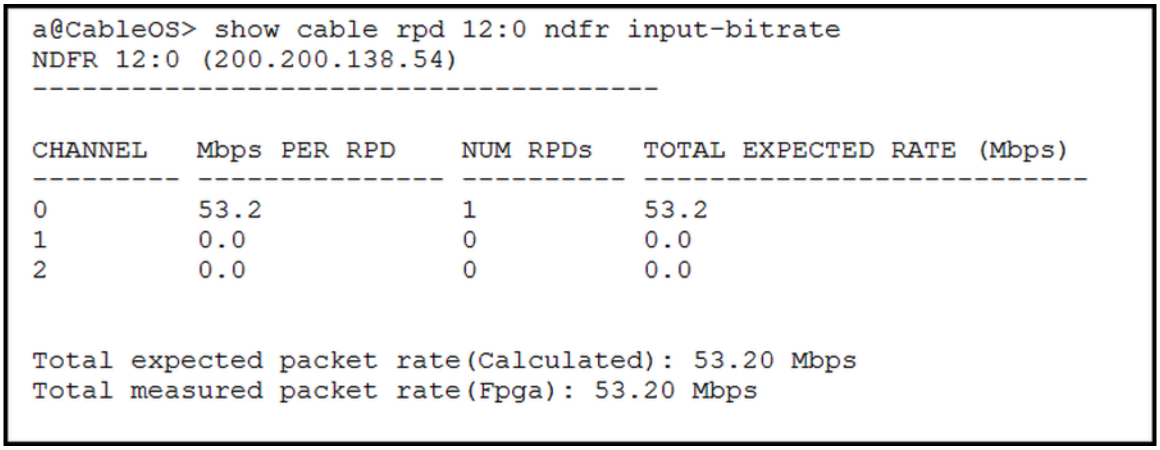
```
- a@CableOS> show cable rpd 2:0 ndfr status

Error: this RPD is not an NDFR device
```

Use the `clear-alarms` option to clear the underflow bits:



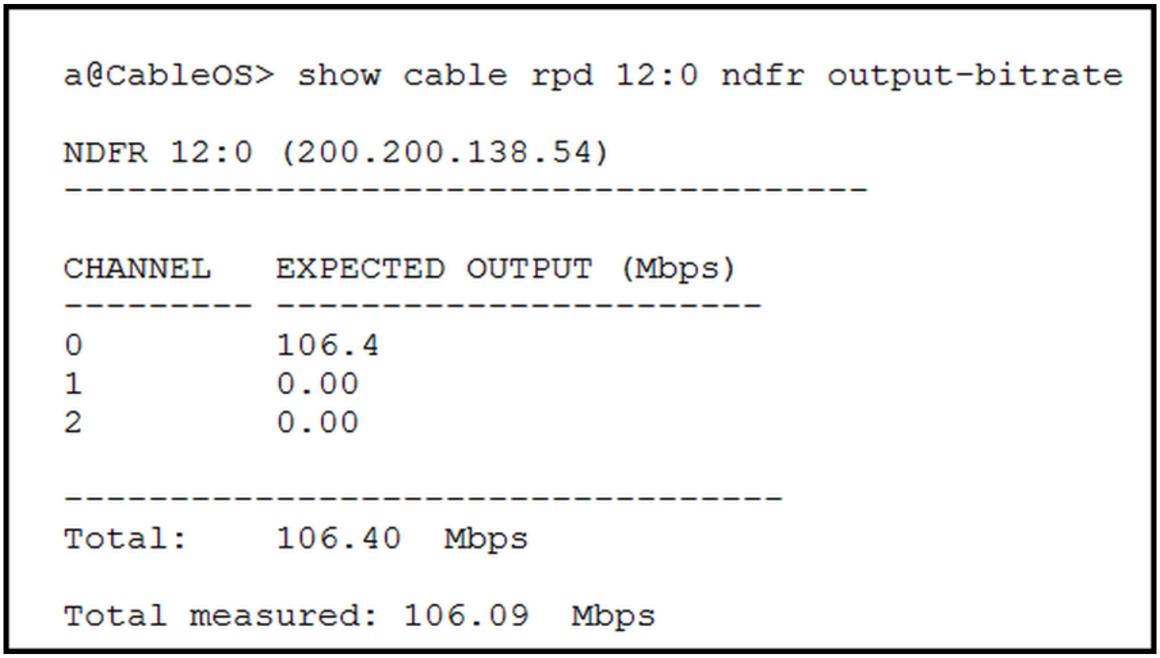
```
a@CableOS> show cable rpd 12:0 ndfr clear-alarms

NDFR 12:0 (200.200.138.54)
--------------------------------------

Clear Channel 0 Session Underflow Status
```

Show the input bitrate for each channel:



```
a@CableOS> show cable rpd 12:0 ndfr input-bitrate
NDFR 12:0 (200.200.138.54)
--------------------------------------

CHANNEL   Mbps PER RPD    NUM RPDs   TOTAL EXPECTED RATE (Mbps)
--------- --------------- ---------- ---------------------------
0         53.2            1          53.2
1         0.0             0          0.0
2         0.0             0          0.0


Total expected packet rate(Calculated): 53.20 Mbps
Total measured packet rate(Fpga): 53.20 Mbps
```

Show the output bitrate for each channel:



```
a@CableOS> show cable rpd 12:0 ndfr output-bitrate

NDFR 12:0 (200.200.138.54)
--------------------------------------

CHANNEL   EXPECTED OUTPUT (Mbps)
--------- -----------------------
0         106.4
1         0.00
2         0.00

----------------------------------
Total:    106.40  Mbps

Total measured: 106.09  Mbps
```

show cable rpd passive

Use the `show cable rpd passive` command to display the software version on the passive partition of all connected RPDs.

```
show cable rpd passive
```

Syntax description

This command has no arguments or keywords.

Default

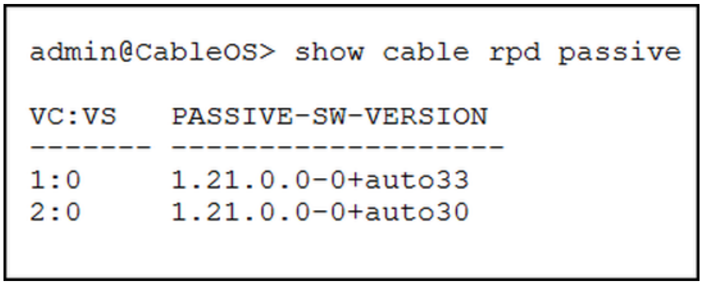
This command has no default value.

Command mode

Exec mode

Examples

An example of the output for the command:



```
admin@CableOS> show cable rpd passive

VC:VS    PASSIVE-SW-VERSION
-------- --------------------
1:0      1.21.0.0-0+auto33
2:0      1.21.0.0-0+auto30
```

Output columns

Field	Description
VC:VS	Virtual Slot. Format: <0-99>:<0-99>
PASSIVE SW-VERSION	The Remote PHY installed version on the passive partition.

show cable rpd port-transceiver

Use the `show cable rpd port-transceiver` command to display information about available SFP ports on the RPD.

```
show cable rpd [ { v-slot  | rpd-ip  | rpd-mac } ] port-transceiver [verbose]
```

Syntax description

`v-slot`	See *CLI: Cable interface identifiers syntax* for more details.
`rpd-ip`	The IP address of a specific RPD.
`rpd-mac`	The MAC address of a specific RPD.
`verbose`	Displays detailed SFP information for all or specific RPDs on the system.

Default

This command has no default value.

Command mode

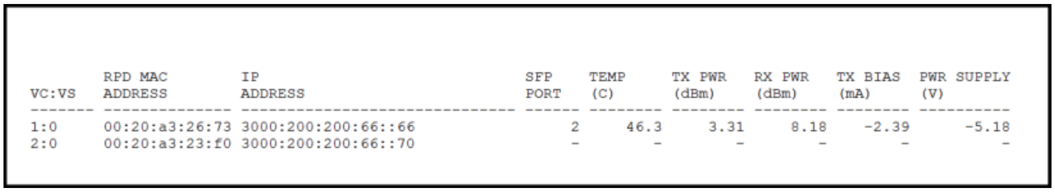
Exec mode.

Examples

The following example displays the SFP port info summary for each RPD available on the system:

(See the explanation of output columns after the next example.)

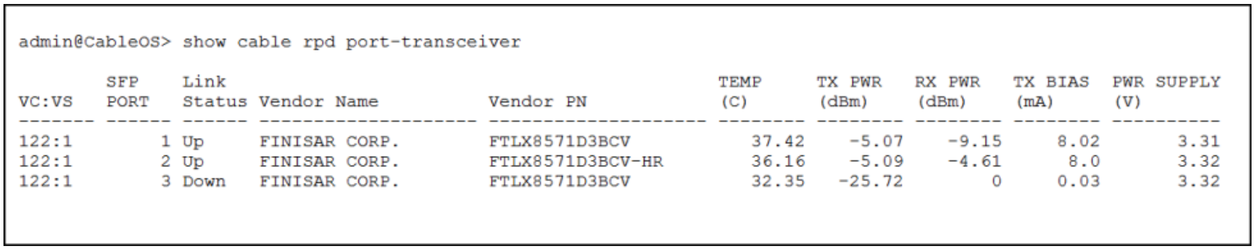
```
show cable rpd port-transceiver
```



```
        RPD MAC        IP                             SFP    TEMP     TX PWR   RX PWR   TX BIAS  PWR SUPPLY
VC:VS   ADDRESS        ADDRESS                        PORT   (C)      (dBm)    (dBm)    (mA)     (V)
------- -------------- ------------------------------ ------ -------- -------- -------- -------- ----------
1:0     00:20:a3:26:73 3000:200:200:66::66                 2     46.3     3.31     8.18    -2.39      -5.18
2:0     00:20:a3:23:f0 3000:200:200:66::70                 -        -        -        -        -          -
```

The following example displays information for a specific RPD on the system:

```
show cable rpd 2:0 port-transceiver
```



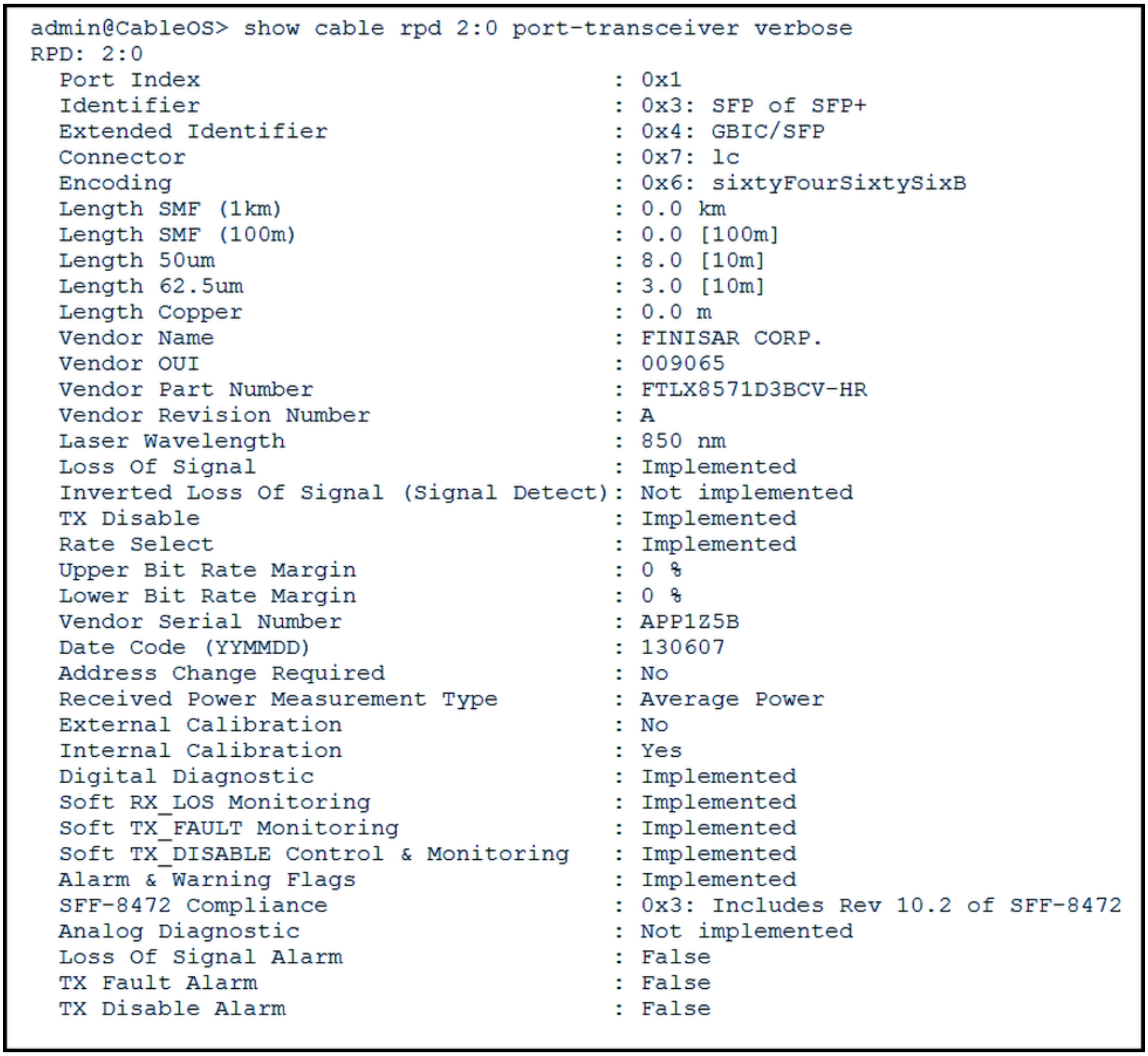
```
admin@CableOS> show cable rpd port-transceiver

        SFP    Link                                                     TEMP     TX PWR   RX PWR   TX BIAS  PWR SUPPLY
VC:VS   PORT   Status Vendor Name          Vendor PN            (C)      (dBm)    (dBm)    (mA)     (V)
------- ------ ------ -------------------- -------------------- -------- -------- -------- -------- ----------
122:1        1 Up     FINISAR CORP.        FTLX8571D3BCV           37.42    -5.07    -9.15     8.02       3.31
122:1        2 Up     FINISAR CORP.        FTLX8571D3BCV-HR        36.16    -5.09    -4.61      8.0       3.32
122:1        3 Down   FINISAR CORP.        FTLX8571D3BCV           32.35   -25.72        0     0.03       3.32
```

Output columns

Field	**Description**
SFP PORT	SFP Port number on RPD
TEMP	Internally measured module temperature
TX PWR	Measured TX output power
RX PWR	Measured RX input power
TX BIAS	Internally measured TX Bias Current
PWR SUPPLY	Internally measured supply voltage in transceiver

The following verbose example displays additional information for a specific RPD on the system:

```
show cable rpd 2:0 port-transceiver verbose
```



```
admin@CableOS> show cable rpd 2:0 port-transceiver verbose
RPD: 2:0
  Port Index                             : 0x1
  Identifier                             : 0x3: SFP of SFP+
  Extended Identifier                    : 0x4: GBIC/SFP
  Connector                              : 0x7: lc
  Encoding                               : 0x6: sixtyFourSixtySixB
  Length SMF (1km)                       : 0.0 km
  Length SMF (100m)                      : 0.0 [100m]
  Length 50um                            : 8.0 [10m]
  Length 62.5um                          : 3.0 [10m]
  Length Copper                          : 0.0 m
  Vendor Name                            : FINISAR CORP.
  Vendor OUI                             : 009065
  Vendor Part Number                     : FTLX8571D3BCV-HR
  Vendor Revision Number                 : A
  Laser Wavelength                       : 850 nm
  Loss Of Signal                         : Implemented
  Inverted Loss Of Signal (Signal Detect): Not implemented
  TX Disable                             : Implemented
  Rate Select                            : Implemented
  Upper Bit Rate Margin                  : 0 %
  Lower Bit Rate Margin                  : 0 %
  Vendor Serial Number                   : APP1Z5B
  Date Code (YYMMDD)                     : 130607
  Address Change Required                : No
  Received Power Measurement Type        : Average Power
  External Calibration                   : No
  Internal Calibration                   : Yes
  Digital Diagnostic                     : Implemented
  Soft RX_LOS Monitoring                 : Implemented
  Soft TX_FAULT Monitoring               : Implemented
  Soft TX_DISABLE Control & Monitoring   : Implemented
  Alarm & Warning Flags                  : Implemented
  SFF-8472 Compliance                    : 0x3: Includes Rev 10.2 of SFF-8472
  Analog Diagnostic                      : Not implemented
  Loss Of Signal Alarm                   : False
  TX Fault Alarm                         : False
  TX Disable Alarm                       : False
```

Output columns

Port Index	The index of the port where the SFP module is installed
Identifier	Type of serial transceiver
Extended Identifier	Extended identifier of type of serial transceiver
Connector	Connector type
Encoding	Serial encoding algorithm
Length SMF (1 km)	Link length supported for 9/125 Âµm fiber, units of km, zero value means not supported

Length SMF (100m)	Link length supported for 9/125 Âµm fiber, units of 100m, zero value means not supported
Length 50µm	Link length supported for 50/125 Âµm fiber, units of 10m, zero value means not supported
Length 62.5µm	Link length supported for 62.5/125 Âµm fiber, units of 10m, zero value means not supported
Length Copper	Link length supported for copper, units of m, zero value means not supported
Vendor Name	SFP vendor name
Vendor OUI	SFP vendor IEEE company ID
Vendor Part Number	Part number provided by SFP vendor
Vendor Revision Number	Revision number for part number provided by vendor
Laser Wavelength	Laser wavelength
Loss of Signal	Digital state of the LOS Output Pin
Inverted Loss of Signal	Indicates if Loss of Signal (signal inverted) is implemented
TX Disable	Indicates if TX_DISABLE is implemented and disables the serial output
Rate Select	Indicates if RATE_SELECT is implemented
Upper Bit Rate Margin	Upper bit rate margin, units of %
Lower Bit Rate Margin	Lower bit rate margin, units of %
Vendor Serial Number	Serial number provided by vendor
Date Code YYMMDD	Vendor manufacturing date code
Address Change Required	Address change required
Received Power Measurement Type	Received power measurement type
External Calibration	Externally calibrated
Internal Calibration	Internally calibrated
Digital Diagnostic	Indicates if digital diagnostic monitoring is implemented

Soft RX LOS Monitoring	Indicates if optional Soft RX_LOS monitoring is implemented
Soft TX Fault Monitoring	Indicates if optional Soft TX_FAULT monitoring is implemented
Soft TX Disable Control & Monitoring	Indicates if optional Soft TX_DISABLE control and monitoring is implemented
Alarm and Warning Flags	Indicates if optional Alarm/warning flags implemented* for all monitored quantities
SFF-8472 Compliance	Indicates with which revision of SFF-8472 the transceiver complies
Analog Diagnostic	Indicates if analog diagnostic monitoring is implemented
Loss of Signal	Indicates if Loss of Signal is implemented
TX Fault Alarm	Digital state of the TX Fault Output Pin
TX Disable Alarm	Digital state of the TX Disable Input Pin

show cable rpd * ptp

Use the `show cable rpd ptp time-property` command to display the PTP clock time properties. Use the `show cable rpd ptp verbose` command to display the current status ot the PTP.

`show cable rpd` *v-slot* `ptp` [`time-property` | `verbose`]

Syntax description

v-slot	See *CLI: Cable interface identifiers syntax* for more details.

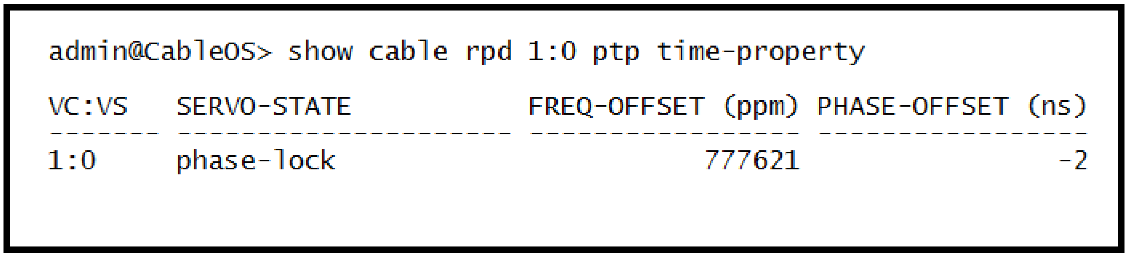
Command mode

Exec mode.

Examples

The following example shows the clock properties for slot zero in chassis one:

```
show cable rpd 1:0 ptp time-property
```

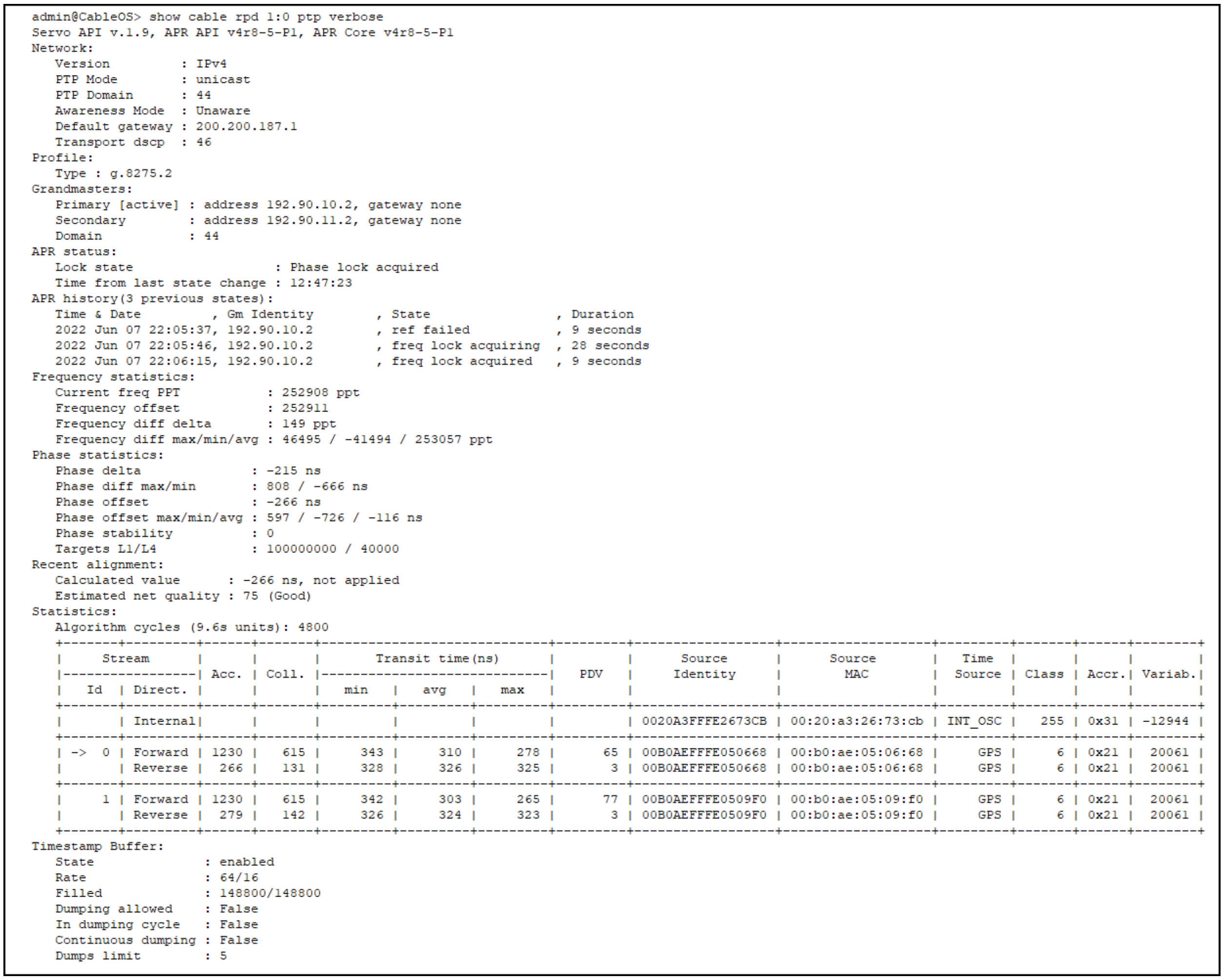


```
admin@CableOS> show cable rpd 1:0 ptp time-property

VC:VS    SERVO-STATE           FREQ-OFFSET (ppm) PHASE-OFFSET (ns)
-------  --------------------- ----------------- -----------------
1:0      phase-lock                       777621                -2
```

Output columns

Field	Description
VC:VS	The virtual chassis and slot of the RPD
SERVO-STATE	The PTP status, which can be one of the following: • 1588 Locked - Good state • phase-lock-acquired • States acceptable during system initialization or switchover • freq-lock-acquiring • freq-lock-acquired • holdover • Error states • ref-failed • no-active-server • unknown • manual-freerun • manual-holdover • manual-servo-holdover • aprstate-max
FREQ-OFFSET (ppm)	The frequency offset from the GM in Parts Per Million (clock offset * 10^12)
PHASE-OFFSET (ns)	The phase offset from the GM in nanoseconds

The following example shows the current status of the PTP:



```
admin@CableOS> show cable rpd 1:0 ptp verbose
Servo API v.1.9, APR API v4r8-5-P1, APR Core v4r8-5-P1
Network:
   Version         : IPv4
   PTP Mode        : unicast
   PTP Domain      : 44
   Awareness Mode  : Unaware
   Default gateway : 200.200.187.1
   Transport dscp  : 46
Profile:
   Type : g.8275.2
Grandmasters:
   Primary [active] : address 192.90.10.2, gateway none
   Secondary        : address 192.90.11.2, gateway none
   Domain           : 44
APR status:
   Lock state                   : Phase lock acquired
   Time from last state change : 12:47:23
APR history(3 previous states):
   Time & Date         , Gm Identity        , State                , Duration
   2022 Jun 07 22:05:37, 192.90.10.2        , ref failed           , 9 seconds
   2022 Jun 07 22:05:46, 192.90.10.2        , freq lock acquiring  , 28 seconds
   2022 Jun 07 22:06:15, 192.90.10.2        , freq lock acquired   , 9 seconds
Frequency statistics:
   Current freq PPT           : 252908 ppt
   Frequency offset           : 252911
   Frequency diff delta       : 149 ppt
   Frequency diff max/min/avg : 46495 / -41494 / 253057 ppt
Phase statistics:
   Phase delta              : -215 ns
   Phase diff max/min       : 808 / -666 ns
   Phase offset             : -266 ns
   Phase offset max/min/avg : 597 / -726 / -116 ns
   Phase stability          : 0
   Targets L1/L4            : 100000000 / 40000
Recent alignment:
   Calculated value      : -266 ns, not applied
   Estimated net quality : 75 (Good)
Statistics:
   Algorithm cycles (9.6s units): 4800
   +-------+---------+------+-------+-----------------------------+---------+------------------+-------------------+---------+-------+------+--------+
   |     Stream      |      |       |      Transit time(ns)       |         |      Source      |       Source      |  Time   |       |      |        |
   |-----------------| Acc. | Coll. |-----------------------------|   PDV   |     Identity     |        MAC        | Source  | Class | Accr.| Variab.|
   |  Id   | Direct. |      |       |   min   |   avg   |   max   |         |                  |                   |         |       |      |        |
   +-------+---------+------+-------+---------+---------+---------+---------+------------------+-------------------+---------+-------+------+--------+
   |       | Internal|      |       |         |         |         |         | 0020A3FFFE2673CB | 00:20:a3:26:73:cb | INT_OSC |   255 | 0x31 | -12944 |
   +-------+---------+------+-------+---------+---------+---------+---------+------------------+-------------------+---------+-------+------+--------+
   | ->  0 | Forward | 1230 |   615 |     343 |     310 |     278 |      65 | 00B0AEFFFE050668 | 00:b0:ae:05:06:68 |     GPS |     6 | 0x21 |  20061 |
   |       | Reverse |  266 |   131 |     328 |     326 |     325 |       3 | 00B0AEFFFE050668 | 00:b0:ae:05:06:68 |     GPS |     6 | 0x21 |  20061 |
   +-------+---------+------+-------+---------+---------+---------+---------+------------------+-------------------+---------+-------+------+--------+
   |     1 | Forward | 1230 |   615 |     342 |     303 |     265 |      77 | 00B0AEFFFE0509F0 | 00:b0:ae:05:09:f0 |     GPS |     6 | 0x21 |  20061 |
   |       | Reverse |  279 |   142 |     326 |     324 |     323 |       3 | 00B0AEFFFE0509F0 | 00:b0:ae:05:09:f0 |     GPS |     6 | 0x21 |  20061 |
   +-------+---------+------+-------+---------+---------+---------+---------+------------------+-------------------+---------+-------+------+--------+
Timestamp Buffer:
   State              : enabled
   Rate               : 64/16
   Filled             : 148800/148800
   Dumping allowed    : False
   In dumping cycle   : False
   Continuous dumping : False
   Dumps limit        : 5
```

Related information

cable rpd ptp

show cable rpd

show cable rpd counters

show cable rpd session

show cable rpd video-channel

show cable rpd reset-history

Use the `show cable rpd reset-history` command to display the reasons why a specific RPD has been resetting.

`show cable rpd` *v-slot* `reset-history`

Syntax description

v-slot	See *CLI: Cable interface identifiers syntax* for more details.

Default

This command has no default value.

Command mode

Exec mode

Usage guidelines

The reasons for reboots are written into the `/var/log/reset-cause` file on the RPD. This command will display the latest entries in the file, up to a maximum of 100. A factory reset of the RPD will clear the file.

Reset Code	Reset Reason	Description
1XX - Expected Resets		
100	Factory reset. Reset from rpd-cli	Factory reset from RPD CLI was performed.
101	Factory reset. Reset through GCP	Factory reset from Core CLI was performed.
102	Hard reset. Reset from rpd-cli	Hard reset from RPD CLI was performed.
103	Hard reset. Reset through GCP	Hard reset from Core CLI was performed.
104	Non-volatile reset. Reset from rpd-cli	Non-volatile reset from RPD CLI was performed.
105	Non-volatile reset. Reset through GCP	Non-volatile reset from Core CLI was performed.
106	Soft reset. Reset from rpd-cli	Soft reset from RPD CLI was performed.
107	Soft reset. Reset through GCP	Soft reset from Core CLI was performed.
108	Shell reboot	Shell reboot was performed.
109	Reboot after ST Firmware upgrade	Reboot after ST Firmware upgrade was performed.
110	RPD has been automatically rebooted to start using new NDFR configuration	RPD has been automatically rebooted to start using a new NDFR configuration.
111	CPLD upgrade done	CPLD upgrade done.
112	RPD S/W upgrade	RPD software upgrade was done.

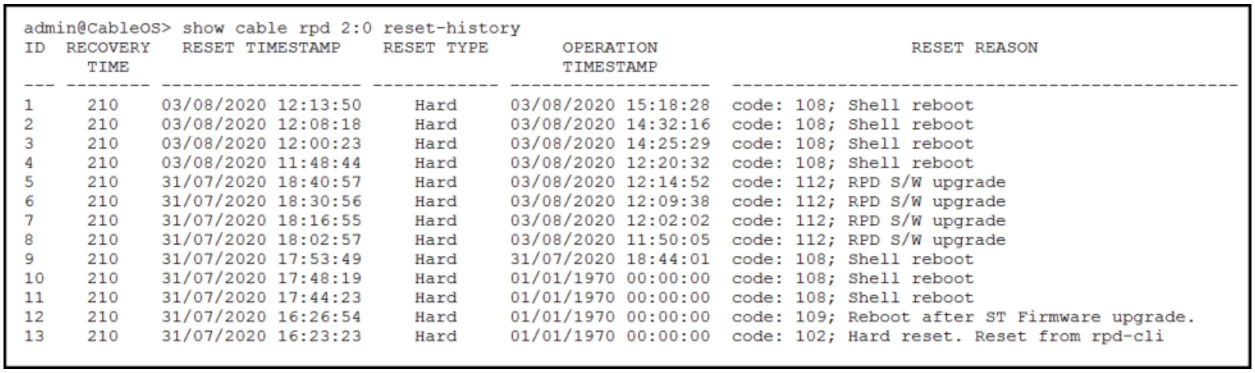
Reset Code	Reset Reason	Description
113	STM32 upgrade (RPD S/W upgrade)	STM32 upgrade was done with an RPD Software upgrade.
2XX - Network Initialization Issues		
200	Bad DHCP config: empty CCAP core list	Reset because of an empty CCAP core list in the DHCP config.
201	Bad DHCP config: no mask / prefix len	Reset because of no mask / prefix length in the DHCP config.
202	Bad DHCP config: no IP address	Reset because of no IP address in the DHCP config.
203	DHCP lease for IPv4 was expired. (ip_stack = IPv4 only)	Reset because the DHCP lease for IPv4 expired.
204	DHCP lease for IPv6 was expired	Reset because the DHCP lease for IPv6 expired.
205	DHCP lease file for IPv4 has been changed	Reset because the DHCP lease file for IPv4 has been changed.
206	DHCP lease file for IPv6 has been changed	Reset because the DHCP lease file for IPv6 has been changed.
207	Failed to establish ToD	Reset because failed to establish ToD
3XX - nsg-gcp Issues		
300	nsggcpd. Process nsggcpd had crashed. Please grab \'show tech support\'	Process nsggcpd had crashed
301	nsggcpd. business logic thread hearbeat check failed to complete within 180 sec	Reset because the business logic thread heartbeat check failed to complete within 180 seconds.
302	nsggcpd. Reconnection to principal core failed and GcpRecoveryActionDelay=0	Reset because the reconnection to principal core failed and GcpRecoveryActionDelay=0.
303	nsggcpd. GCP Failure Recovery Action is set to WaitAndReboot and GcpRecoveryActionDelay=0	Reset because the GCP Failure Recovery Action is set to WaitAndReboot and GcpRecoveryActionDelay=0.
304	nsggcpd. Not connected (re-connected) to the core within desired timeout	Reset because of no connection to the Core within the desired timeout.
305	nsggcpd. No MoveToOperational within timeout.	Reset because of no MoveToOperational within timeout.
306	nsggcpd. Disconnect while waiting for InitialConfigurationComplete message.	Reset because of disconnection while waiting for InitialConfigurationComplete message.

Reset Code	Reset Reason	Description
307	nsggcpd. Disconnect while waiting for MoveToOperational message.	Reset because of disconnection while waiting for MoveToOperational message.
308	nsggpcd. No connection established within timeout	Reset because of no connection established within timeout.
309	nsggcpd. No IRA within timeout.	Reset because of no IRA within timeout.
310	nsggcpd: Redirection failure. No active principal Core found.	Reset because of redirection failure. No active principal Core found.
311	nsggcpd: Redirection failure. No valid IP address on the redirect list while re-initiating redirection.	Reset because of redirection failure. No valid IP address on the redirect list while re-initiating redirection.
312	nsggcpd: No InitialConfigurationComplete within timeout.	Reset because of no InitialConfigurationComplete within timeout.
313	nsggcpd: No InitialConfigurationComplete message.	Reset because of no InitialConfigurationComplete message.
314	nsggcpd: No MoveToOperational message.	Reset because of no MoveToOperational message.
315	nsggcpd: No CONFIG within timeout.	Reset because of no CONFIG within timeout.
316	nsggcpd: No isPrincipal=True received within timeout for core that is expected to be principal.	Reset because of no isPrincipal=True received within timeout for a Core that is expected to be the principal.
317	nsggcpd: No IRA message.	Reset because of no IRA message.
318	nsggcpd: No config message.	Reset because of no config message.
319	nsggcpd: GcpRecoveryAction set to WaitAndReboot.	Reset because of GcpRecoveryAction set to WaitAndReboot.
4XX - dulc-mgr Issues		
400	dulcmgrd: linecard thread hearbeat check failed to complete within 900 sec	Reset because the linecard thread heartbeat check failed to complete within 900 seconds for dulc-mgr process.
401	dulcmgrd: linecard manager thread hearbeat check failed to complete within 900 sec	Reset because the linecard manager thread heartbeat check failed to complete within 900 seconds for dulc-mgr process.
402	dulcmgrd: Chip initialization failed	Reset because of chip initialization failure.

Reset Code	Reset Reason	Description
403	dulcmgrd: Process had crashed. Please grab 'show tech support'	Reset because of dulc-mgr process crash.
5XX - larch-ros Issues		
500	larch-ros: default gw connectivity timeout.	Reset because of default gateway connectivity timeout for larch-ros.
501	larch-ros: Process had crashed. Please grab 'show tech support'	Reset because of crash of the larch-ros process.
6XX - Unexpected Resets		
600	Unknown reset type	Unknown reset type.
601	ST watchdog reset occurred	ST watchdog reset occurred.
602	Power reset occurred	Power reset occurred.
7XX - depictld Issues		
700	depictld: Process had crashed. Please grab 'show tech support'	Reset because of crash of the depictld process.

Examples

This example shows the resets performed on RPD 2:0:



```
admin@CableOS> show cable rpd 2:0 reset-history
ID  RECOVERY   RESET TIMESTAMP    RESET TYPE       OPERATION                       RESET REASON
      TIME                                         TIMESTAMP
--- -------- ------------------- ------------ -------------------  ------------------------------------------------
1     210    03/08/2020 12:13:50     Hard     03/08/2020 15:18:28  code: 108; Shell reboot
2     210    03/08/2020 12:08:18     Hard     03/08/2020 14:32:16  code: 108; Shell reboot
3     210    03/08/2020 12:00:23     Hard     03/08/2020 14:25:29  code: 108; Shell reboot
4     210    03/08/2020 11:48:44     Hard     03/08/2020 12:20:32  code: 108; Shell reboot
5     210    31/07/2020 18:40:57     Hard     03/08/2020 12:14:52  code: 112; RPD S/W upgrade
6     210    31/07/2020 18:30:56     Hard     03/08/2020 12:09:38  code: 112; RPD S/W upgrade
7     210    31/07/2020 18:16:55     Hard     03/08/2020 12:02:02  code: 112; RPD S/W upgrade
8     210    31/07/2020 18:02:57     Hard     03/08/2020 11:50:05  code: 112; RPD S/W upgrade
9     210    31/07/2020 17:53:49     Hard     31/07/2020 18:44:01  code: 108; Shell reboot
10    210    31/07/2020 17:48:19     Hard     01/01/1970 00:00:00  code: 108; Shell reboot
11    210    31/07/2020 17:44:23     Hard     01/01/1970 00:00:00  code: 108; Shell reboot
12    210    31/07/2020 16:26:54     Hard     01/01/1970 00:00:00  code: 109; Reboot after ST Firmware upgrade.
13    210    31/07/2020 16:23:23     Hard     01/01/1970 00:00:00  code: 102; Hard reset. Reset from rpd-cli
```

Output columns

Field	Description
ID	The reset instance index number
Recovery Time	tTe number of seconds that elapsed between the time the reset event started and the completion of the local RPD initialization stage
Reset Timestamp	The time the reset occurred
Reset Type	The type of reset that was recording. There are four possible reset types:

Field	Description
	• Hard • Soft • Non-volatile • Factory
Operation Timestamp	The time at which the RPD was moved to operational by the Principal Core
Reset Reason	A vendor-specific string with a explanation of why the RPD was reset

show cable rpd session

Use the `show cable rpd session` command to display all DEPI sessions for specific RPDs.

`show cable rpd` [{ *v-slot mac ip* }] `session`

Syntax description

v-slot	See *CLI: Cable interface identifiers syntax* for more details.

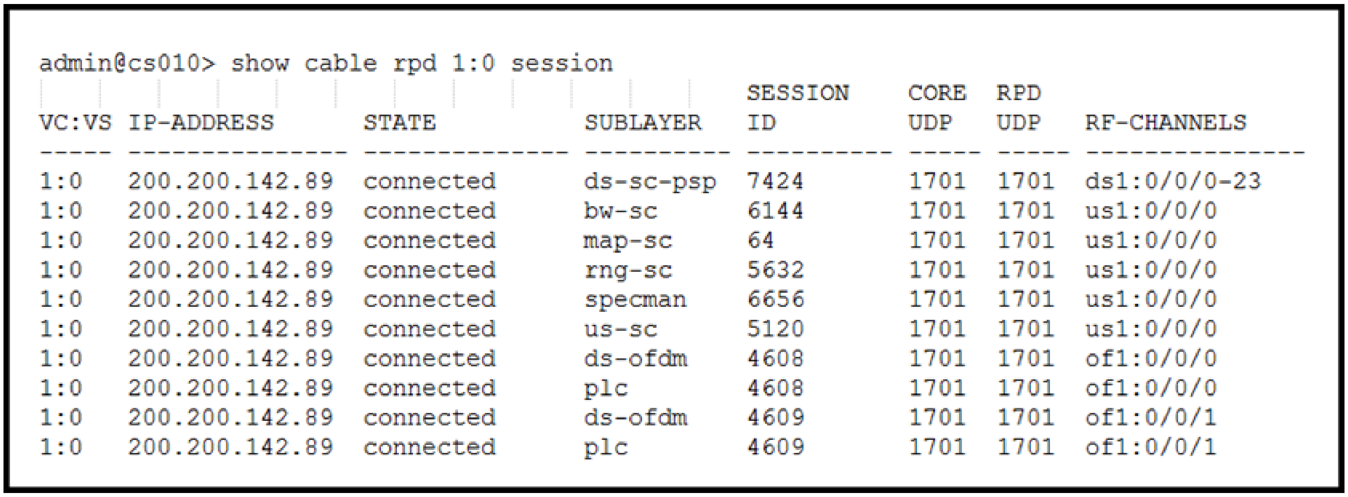
Command mode

Exec mode.

Examples

The following example shows the DEPI sessions for slot zero in chassis one:

```
show cable rpd 1:0 session
```



```
admin@cs010> show cable rpd 1:0 session
                                                 SESSION     CORE  RPD
VC:VS  IP-ADDRESS       STATE           SUBLAYER   ID          UDP   UDP   RF-CHANNELS
-----  ---------------  --------------  ---------- ----------  ----- ----- ----------------
1:0    200.200.142.89   connected       ds-sc-psp  7424        1701  1701  ds1:0/0/0-23
1:0    200.200.142.89   connected       bw-sc      6144        1701  1701  us1:0/0/0
1:0    200.200.142.89   connected       map-sc     64          1701  1701  us1:0/0/0
1:0    200.200.142.89   connected       rng-sc     5632        1701  1701  us1:0/0/0
1:0    200.200.142.89   connected       specman    6656        1701  1701  us1:0/0/0
1:0    200.200.142.89   connected       us-sc      5120        1701  1701  us1:0/0/0
1:0    200.200.142.89   connected       ds-ofdm    4608        1701  1701  of1:0/0/0
1:0    200.200.142.89   connected       plc        4608        1701  1701  of1:0/0/0
1:0    200.200.142.89   connected       ds-ofdm    4609        1701  1701  of1:0/0/1
1:0    200.200.142.89   connected       plc        4609        1701  1701  of1:0/0/1
```

Output columns

Field	Description
VC:VS	The virtual chassis and slot of the RPD
IP-ADDRESS	The IP address of the RPD
State	The session state
Sublayer	The session sublayer
ID	The session ID
CORE UDP	The Core UDP Port number
RPD UPD	The RPD UDP Port number
RF-Channels	The RF channels

Related information

show cable rpd
show cable rpd counters
show cable rpd * ptp
show cable rpd video-channel

show cable rpd spanning-tree

Use the `show cable rpd spanning-tree` command to monitor the state of the closed loop rings.

`show cable rpd` *vc:vs* `spanning-tree` [`mstp` [*instance-id* [`brief` | `verbose`]

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
instance-id	The MSTP instance you want to monitor.
`brief|verbose`	Define if you want a brief or full report. the default is `brief`.

Default

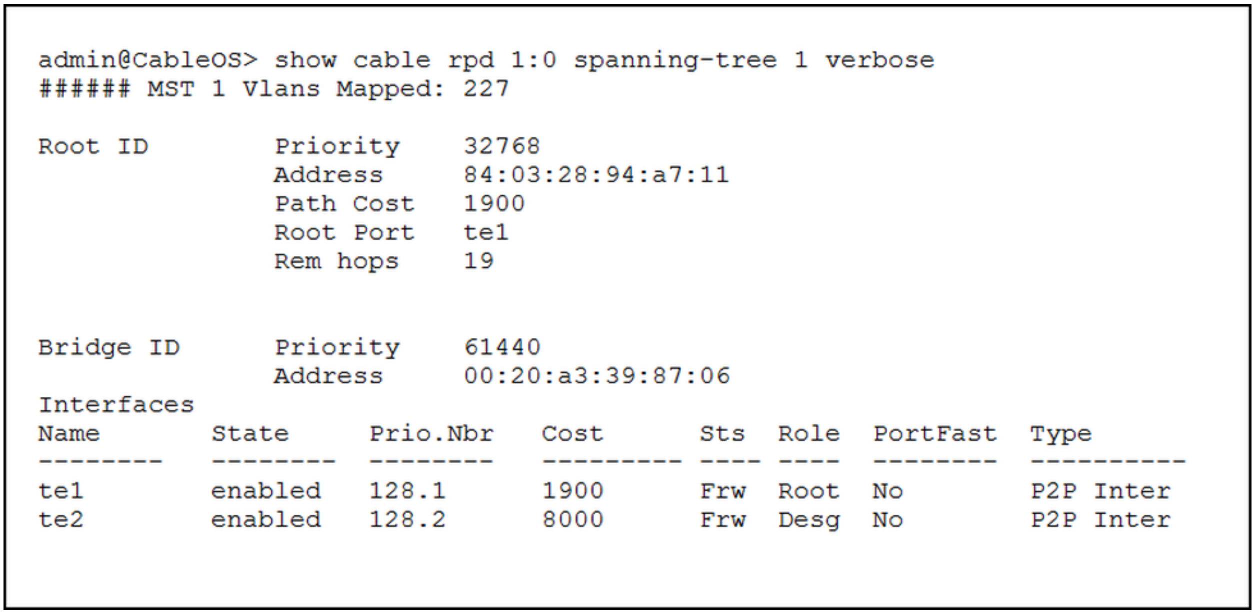
This command has no default value.

Command mode

Exec mode

Examples

The example below shows the status of the spanning tree for a specific instance:



```
admin@CableOS> show cable rpd 1:0 spanning-tree 1 verbose
###### MST 1 Vlans Mapped: 227

Root ID        Priority    32768
               Address     84:03:28:94:a7:11
               Path Cost   1900
               Root Port   te1
               Rem hops    19


Bridge ID      Priority    61440
               Address     00:20:a3:39:87:06
Interfaces
Name       State      Prio.Nbr   Cost       Sts  Role  PortFast  Type
--------   --------   --------   ---------  ---- ----  --------  ----------
te1        enabled    128.1      1900       Frw  Root  No        P2P Inter
te2        enabled    128.2      8000       Frw  Desg  No        P2P Inter
```

Output columns

Field	Description
Root Port	Shows the current active port on the RPD (out of two ports which one is the active one).
Path Cost	Shows the cost of using the Root path.
State	The state of the Port. If it is disabled, that means the port is down.

Related information

spanning-tree mstp

cable rpd * mstp

set cable rpd spanning-tree

show cable rpd ssh-public-key

Use the `show cable rpd ssh-public-key` command to see a list of installed SSH public keys for a given RPD.

`show cable rpd` *vc:vs* `ssh-public-key [verbose]`

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.
vs	The configured Virtual Slot of the RPD, range 0..254.
`verbose`	Displays detailed information.

Default

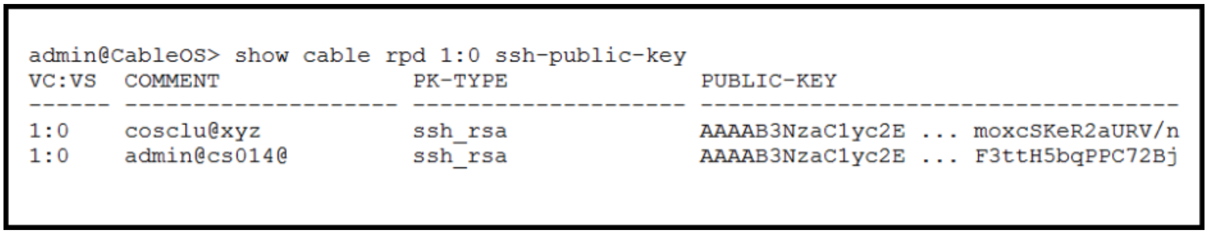
This command has no default value.

Command mode

Exec mode.

Example

The following example shows the profiles installed on the RPD in chassis 1, slot 0:



```
admin@CableOS> show cable rpd 1:0 ssh-public-key
VC:VS  COMMENT              PK-TYPE              PUBLIC-KEY
------ -------------------- -------------------- -----------------------------------
1:0    cosclu@xyz           ssh_rsa              AAAAB3NzaC1yc2E ... moxcSKeR2aURV/n
1:0    admin@cs014@         ssh_rsa              AAAAB3NzaC1yc2E ... F3ttH5bqPPC72Bj
```

Output columns

Field	Description
VC:VS	The virtual channel and slot.
COMMENT	In the format <user>@<core-id>@<timestamp>
PK-TYPE	The public key type
PUBLIC-KEY	The public key string

Related information

cable rpd sshd

cable ssh-public-key default-profile

cable ssh-public-key profile

cable rpd ssh-pk-profile

show cable rpd video-channel

Use the `show cable rpd video-channel` command to display information for a specific RPD video channel.

`show cable rpd` { *v-slot* | *mac* | *ip* } `video-channel` [{ `down-channel-id` } `verbose`] [`counters`]

Syntax description

v-slot | *mac* | *ip*	See *CLI: Cable interface identifiers syntax* for more details.
`down-channel-id`	Specifies a specific down-channel in dsVC:VS/PP/C format.

`verbose`	Shows full information for the video channel.
`counters`	Shows counter information for the video channel.

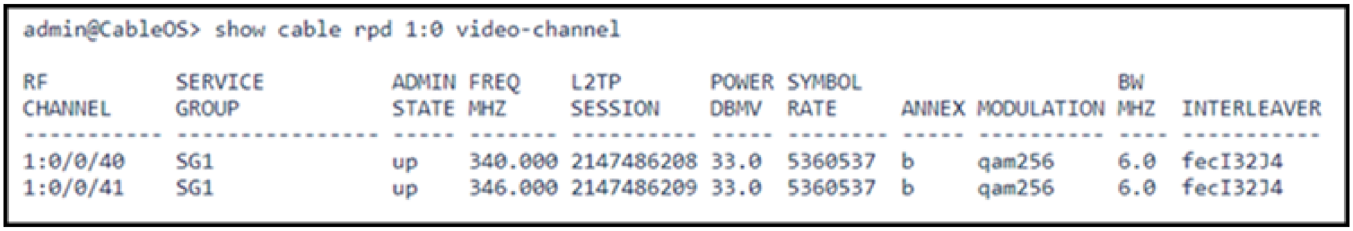
Command mode

Exec mode.

Examples

The following example shows information for all the video channels for slot zero in chassis one:

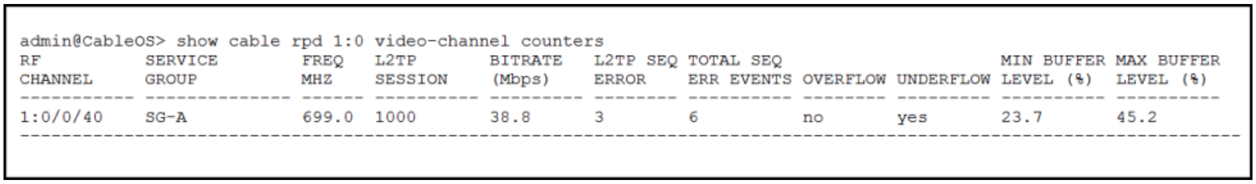
```
show cable rpd 1:0 video-channel
```



```
admin@CableOS> show cable rpd 1:0 video-channel

RF          SERVICE          ADMIN FREQ    L2TP       POWER SYMBOL                     BW
CHANNEL     GROUP            STATE MHZ     SESSION    DBMV  RATE     ANNEX MODULATION MHZ  INTERLEAVER
----------- ---------------- ----- ------- ---------- ----- -------- ----- ---------- ---- -----------
1:0/0/40    SG1              up    340.000 2147486208 33.0  5360537  b     qam256     6.0  fecI32J4
1:0/0/41    SG1              up    346.000 2147486209 33.0  5360537  b     qam256     6.0  fecI32J4
```

The following example shows counter information for all the video channels for slot zero in chassis one:

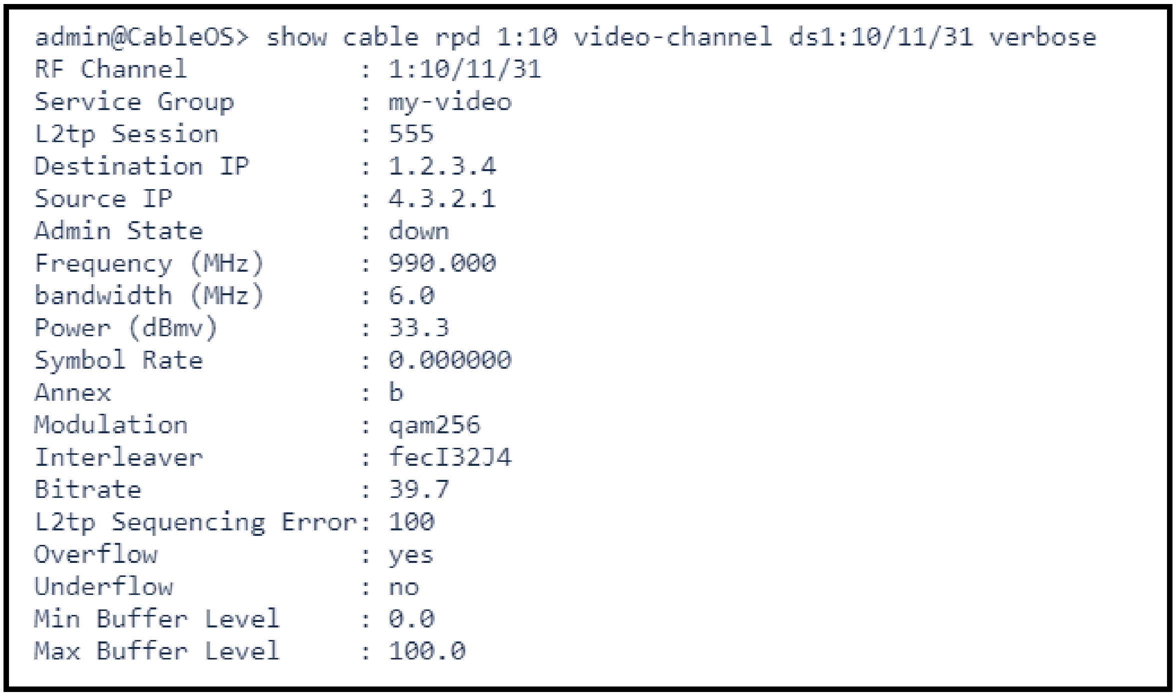
```
show cable rpd 1:0 video-channel counters
```



```
admin@CableOS> show cable rpd 1:0 video-channel counters
RF          SERVICE        FREQ   L2TP       BITRATE   L2TP SEQ TOTAL SEQ                     MIN BUFFER MAX BUFFER
CHANNEL     GROUP          MHZ    SESSION    (Mbps)    ERROR    ERR EVENTS OVERFLOW UNDERFLOW LEVEL (%)  LEVEL (%)
----------- -------------- ------ ---------- --------- -------- ---------- -------- --------- ---------- ----------
1:0/0/40    SG-A           699.0  1000       38.8      3        6          no       yes       23.7       45.2
---------------------------------------------------------------------------------------------------------------------
```

The following example shows full information for a specific video channel in slot 10 in chassis one:

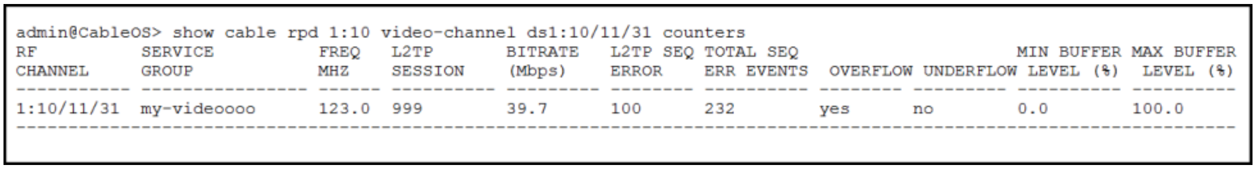
```
show cable rpd 1:10 video-channel ds1:10/11/31 verbose
```



```
admin@CableOS> show cable rpd 1:10 video-channel ds1:10/11/31 verbose
RF Channel           : 1:10/11/31
Service Group        : my-video
L2tp Session         : 555
Destination IP       : 1.2.3.4
Source IP            : 4.3.2.1
Admin State          : down
Frequency (MHz)      : 990.000
bandwidth (MHz)      : 6.0
Power (dBmv)         : 33.3
Symbol Rate          : 0.000000
Annex                : b
Modulation           : qam256
Interleaver          : fecI32J4
Bitrate              : 39.7
L2tp Sequencing Error: 100
Overflow             : yes
Underflow            : no
Min Buffer Level     : 0.0
Max Buffer Level     : 100.0
```

The following example shows counter information for a specific video channel in slot 10 in chassis one:

```
show cable rpd 1:10 video-channel ds1:10/11/31 counters
```



```
admin@CableOS> show cable rpd 1:10 video-channel ds1:10/11/31 counters
RF          SERVICE          FREQ   L2TP       BITRATE   L2TP SEQ TOTAL SEQ                     MIN BUFFER MAX BUFFER
CHANNEL     GROUP            MHZ    SESSION    (Mbps)    ERROR    ERR EVENTS  OVERFLOW UNDERFLOW LEVEL (%)  LEVEL (%)
----------- ---------------- ------ ---------- --------- -------- ---------- -------- --------- ---------- ----------
1:10/11/31  my-videoooo      123.0  999        39.7      100      232         yes      no        0.0        100.0
---------------------------------------------------------------------------------------------------------------------
```

Output columns

Field	**Description**
RF Channel	RF Channel Id
Service Group	Video Service Group Name
Admin State	Channel's Admin state
L2TP Session	L2TP session ID
Destination IP	Destination IP
Source IP	Source IP
Frequency	Channel frequency (MHz)
Bandwidth	Channel bandwidth (MHz)
Power	Channel total power (dBmv)
Annex	Annex

Field	Description
Modulation	Channel modulation
Interleaver	Channel interleaver
L2TP Seq Error	A counter for the number of packets with mismatched sequence numbers for a given QAM. Limitation: Implementation on the HW side currently only indicates events.
Total Seq Err Events	A counter for the total number of packets on the video channel in which a sequence error was detected
Bitrate	The raw bits per second for a given QAM. Calculated by packet size * packet rate * 8
Overflow/Underflow	The buffer overflow or underflow indication for every QAM through a dedicated register for every set of 32 QAMs
Buffer level percentage (Min/Max)	The minimum and maximum buffer level percentage for a given QAM

Related information

show cable rpd

show cable rpd counters

show cable rpd * ptp

show cable rpd session

show cable rpd video-type

Use the `show cable rpd video-type` command to show whether the RPD's video type is synchronous or asynchronous..

`show cable rpd` *v-slot* `video-type`

Syntax description

v-slot	See *CLI: Cable interface identifiers syntax* for more details.

Default

This command has no default value.

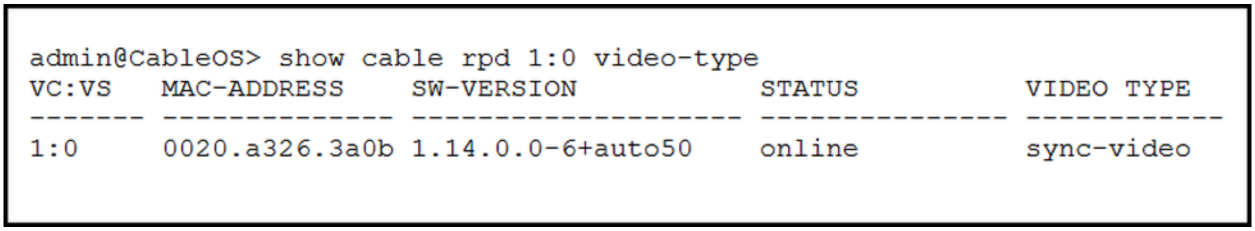
Command mode

Exec mode

Usage guidelines

The video type of the RPD is set by the `cable rpd video-type` command. The default option is *sync-video*.

Examples



```
admin@CableOS> show cable rpd 1:0 video-type
VC:VS   MAC-ADDRESS    SW-VERSION           STATUS          VIDEO TYPE
------- -------------- -------------------- --------------- ------------
1:0     0020.a326.3a0b 1.14.0.0-6+auto50    online          sync-video
```

Output columns

Field	**Description**
VC:VS	The RPD location
MAC-ADDRESS	The MAC address of the RPD
SW-VERSION	The CableOS software version installed on the RPD
STATUS	The current status of the RPD
Video Type	Can be either sync-video or async-video

Related information

cable rpd video-type

show cable us-rf-port ofdma-channel

Use the `show cable us-rf-port ofdma-channel` command to show details of the CMTS operation of an OFDMA channel.

`show cable us-rf-port` *vv:ss/p* `ofdma-channel` [*index*]

Syntax description

vv:ss/p	Selects the us-rf-port configured with "cable us-rf-port vv:ss/p". See *CLI: Cable interface identifiers syntax* for more details.
index	If *index* is present, it selects the OFDMA channel configured with "cable us-rf-port vv:ss/p ofdma-channel index"; permitted index values are 0 and 1. If *index* is omitted, the CMTS shows detailed information on both OFDMA ports.

Command mode

Exec mode.

Usage guidelines

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The following example will display all CMTS operation of OFDMA channel 0 for rf-port 0:

```
show cable us-rf-port 1:0/0 ofdma-channel 0
```

Related information

cable mod-prof-ofdma

cable us-rf-port ofdma-channel

show cable mod-prof-ofdma

show cable us-rf-port ofdma-channel data-mer

Use the `show cable us-rf-port ofdma-channel data-mer` command to show the average or minimum MER data per mini-slot or frequency.

`show cable us-rf-port` *vv:ss/p* `ofdma-channel` [*index*] `data-mer` [`average` | `minimum`] [`frequency` | `mini-slot`] [`graph` | `table`]

Syntax description

vv:ss/p	Selects the us-rf-port configured with "cable us-rf-port vv:ss/p". See *CLI: Cable interface identifiers syntax* for more details.
index	If *index* is present, it selects the OFDMA channel configured with "cable us-rf-port vv:ss/p ofdma-channel index"; permitted index values are 0 and 1. If *index* is omitted, the output shows information for both OFDMA ports.

`average`	The average Rx-MER per MiniSlot for all IUC's together
`minimum`	The minimum Rx-MER per MiniSlot for all IUC's together
`graph`	Graph view
`table`	Table view
`frequency`	The absolute frequency is used as the x-axis
`mini-slot`	The mini-slot number is used as the x-axis

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

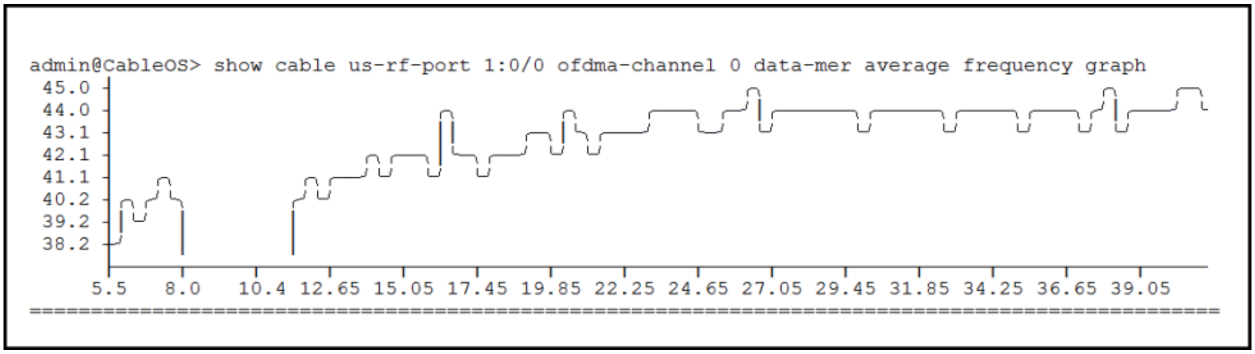
The output reflects the latest data read from the registers and uses the Harmonic Vendor Specific TLV 134 - UsOfdmaChannelMer

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

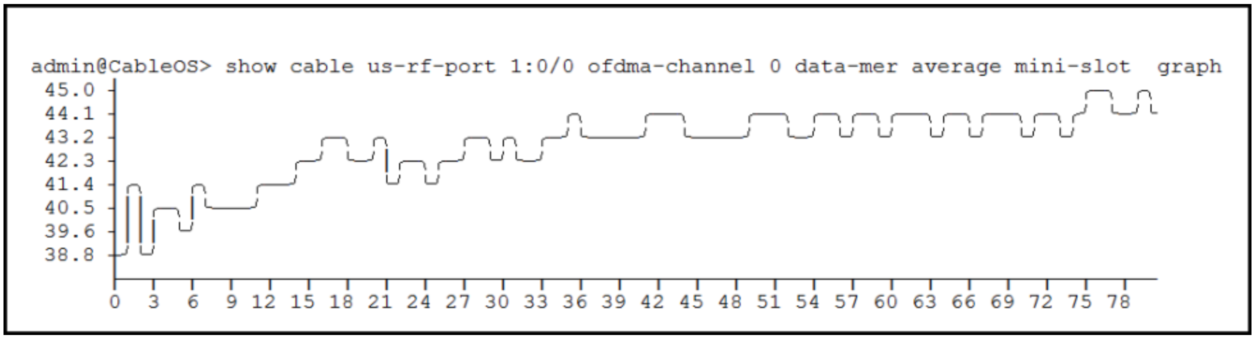
Examples

The example below shows a minimum frequency graph:



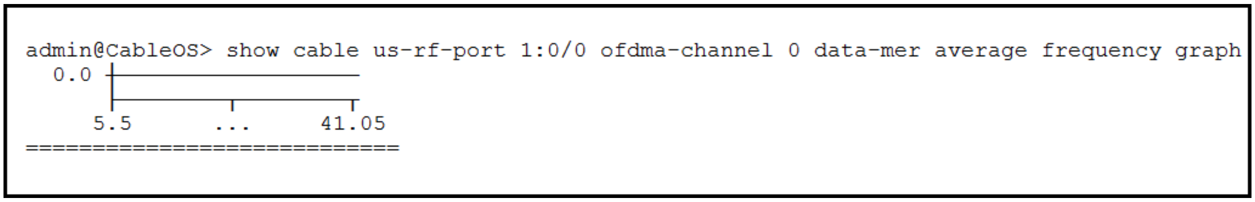
```
admin@CableOS> show cable us-rf-port 1:0/0 ofdma-channel 0 data-mer average frequency graph
```

The example below shows a minimum mini-slot graph:



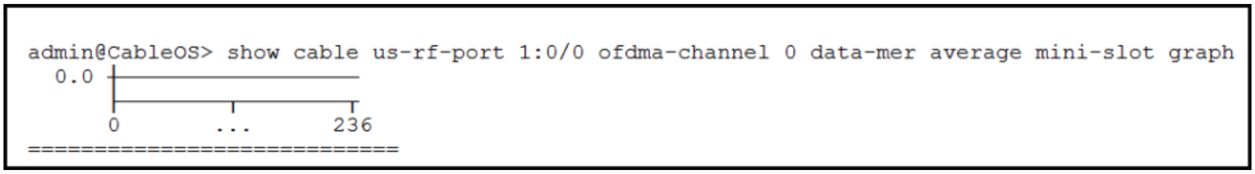
```
admin@CableOS> show cable us-rf-port 1:0/0 ofdma-channel 0 data-mer average mini-slot  graph
 45.0
 44.1
 43.2
 42.3
 41.4
 40.5
 39.6
 38.8
      0  3  6  9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78
```

The example below shows an average frequency graph when there is no traffic on the OFDMA channels:



```
admin@CableOS> show cable us-rf-port 1:0/0 ofdma-channel 0 data-mer average frequency graph
  0.0 +-------------------------
      |
      +------------+-----------+
     5.5          ...        41.05
=============================
```

The example below shows an average mini-slot graph when there is no traffic on the OFDMA channels:



```
admin@CableOS> show cable us-rf-port 1:0/0 ofdma-channel 0 data-mer average mini-slot graph
  0.0 +-------------------------
      |
      +------------+-----------+
      0           ...         236
=============================
```

show cable us-rf-port ofdma-channel probe-mer

Use the `show cable us-rf-port ofdma-channel probe-mer` command to show the average or minimum of the most recent RXMER probe reported by all CMs on the channel.

`show cable us-rf-port` *vv:ss/p* `ofdma-channel` [*index*] `probe-mer` [`average` | `minimum`] [`frequency` | `mini-slot`] [`graph` | `table`]

Syntax description

vv:ss/p	Selects the us-rf-port configured with "cable us-rf-port vv:ss/p". See *CLI: Cable interface identifiers syntax* for more details.
index	If *index* is present, it selects the OFDMA channel configured with "cable us-rf-port vv:ss/p ofdma-channel index"; permitted index values are 0 and 1. If *index* is omitted, the output shows information for both OFDMA ports.
`average`	Report the average Rx-MER per MiniSlot.

`minimum`	Report the minimum Rx-MER per MiniSlot for all IUC's together
`graph`	Graph view
`table`	Table view
`frequency`	The absolute frequency is used as the x-axis
`mini-slot`	The mini-slot number is used as the x-axis

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

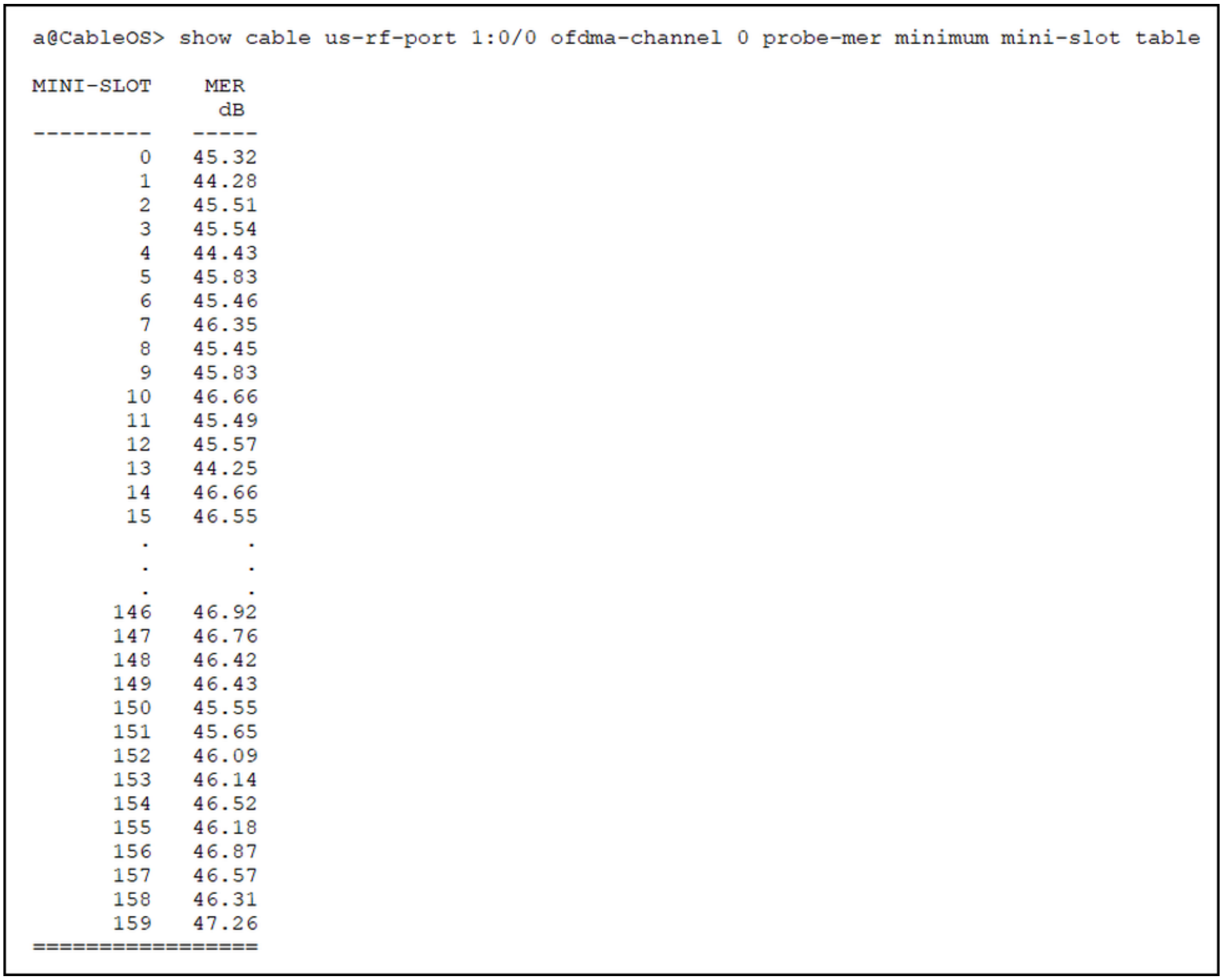
The output reflects the most recent Rx-MER probe reported by all CMs on the channel.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Examples

The example below shows in table form the minimum Rx-MER reported from each mini slot:



```
a@CableOS> show cable us-rf-port 1:0/0 ofdma-channel 0 probe-mer minimum mini-slot table

MINI-SLOT    MER
              dB
---------   -----
        0   45.32
        1   44.28
        2   45.51
        3   45.54
        4   44.43
        5   45.83
        6   45.46
        7   46.35
        8   45.45
        9   45.83
       10   46.66
       11   45.49
       12   45.57
       13   44.25
       14   46.66
       15   46.55
        .       .
        .       .
        .       .
      146   46.92
      147   46.76
      148   46.42
      149   46.43
      150   45.55
      151   45.65
      152   46.09
      153   46.14
      154   46.52
      155   46.18
      156   46.87
      157   46.57
      158   46.31
      159   47.26
=================
```

show cable us-rf-port ucd-refresh

Use the show cable us-rf-port ucd-refresh command to display information about UCD refresh activity.

`show cable us-rf-port ucd-refresh`

Syntax description

This command has no arguments or keywords.

Default

This command has no default value.

Command mode

Exec mode

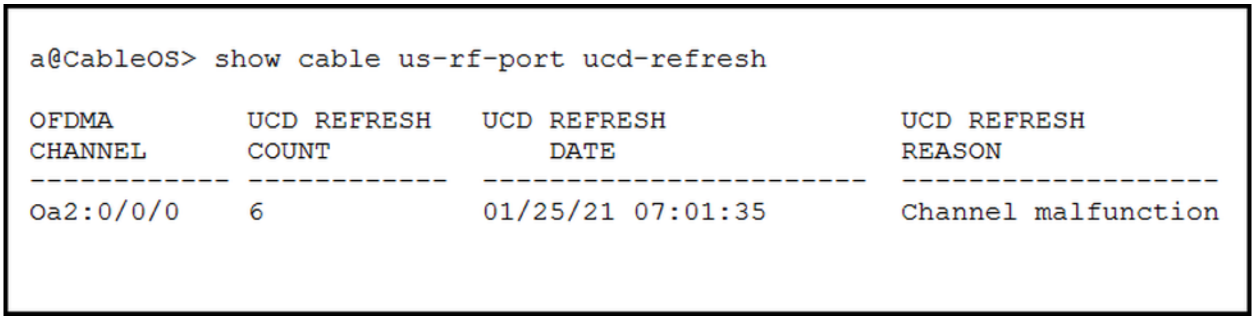
Usage guidelines

The RPD checks once a minute if the OFDMA channel is broken. If it is, RPD resets the OFDMA chip and sends a request for updated UCD from the Core. The Core sends the updated UCD and the RPD reconfigures the OFDMA channel.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Example



```
a@CableOS> show cable us-rf-port ucd-refresh

OFDMA         UCD REFRESH    UCD REFRESH                UCD REFRESH
CHANNEL       COUNT              DATE                   REASON
------------- ------------- ------------------------ --------------------
Oa2:0/0/0     6             01/25/21 07:01:35          Channel malfunction
```

Output columns

Field	Description
UCD Refresh Count	The number of times a UCD Refresh was triggered.
UCD Refresh Date	The date and time of the last UCD Refresh.
UCD Refresh Reason	The reason for the last UCD refresh.

show capture preconfigured us-spectrum

Use the `show capture preconfigured us-spectrum` command to show the state of the `capture preconfigured us-spectrum` command.

`show capture preconfigured us-spectrum` *vc:vs /port* `sac-index` *sac-index*

Syntax description

vc	The configured Virtual Chassis of the RPD, range 1..254.

vs	The configured Virtual Slot of the RPD, range 0..254.
port	The upstream RF port, 0 or 1
sac-index	The Spectrum Analyze Circuit on the RPD. Use 0 and 1 for narrowband and 2 for wideband. For narrowband, SAC 0 always captures the spectrum on RF port 0, SAC 1 always captures the spectrum on RF port 1. For wideband, SAC 2 can capture either RF port 0 or 1.

Default

This command has no default value.

Command mode

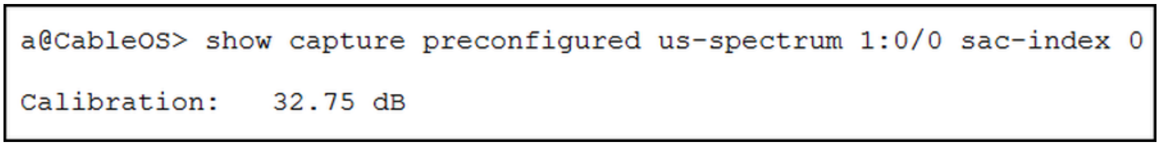
Exec mode

Usage guidelines

This command pulls from the RPD the Calibration Constant from each port information which should be used for the FFT calculation.

Examples

The example below shows the use of the command and the received output:



```
a@CableOS> show capture preconfigured us-spectrum 1:0/0 sac-index 0

Calibration:   32.75 dB
```

Related information

capture preconfigured us-spectrum

show capture us-spectrum

Use the `show capture us-spectrum` command to show the state of capturing Narrow Band FFT packets for a specific upstream port.

`show capture us-spectrum` *vc:vs/port*

Syntax description

`vc:vs/port`	vc: virtual chassis id vs: virual slot id port: port See *CLI: Cable interface identifiers syntax* for more details.

Command mode

Exec mode.

Examples

The following example will show the status for port 1:0/0:

```
show capture us-spectrum 1:0/0
```

Related information

capture us-spectrum start
capture us-spectrum stop
show capture us-wb-spectrum

show capture us-wb-spectrum

Use the `show capture us-wb-spectrum` command to show the state of capturing Wide Band FFT packets for a specific upstream port.

`show capture us-wb-spectrum` *vc:vs/port*

Syntax description

`vc:vs/port`	vc: virtual chassis id vs: virual slot id port: port See *CLI: Cable interface identifiers syntax* for more details.

Command mode

Exec mode.

Examples

The following example will show the status for port 1:0/0:

```
show capture us-wb-spectrum 1:0/0
```

Related information

capture us-wb-spectrum start

capture us-wb-spectrum stop

show capture us-spectrum

show cluster history

Use the `show cluster history` command to display the information history of the current cluster.

`show cluster history`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

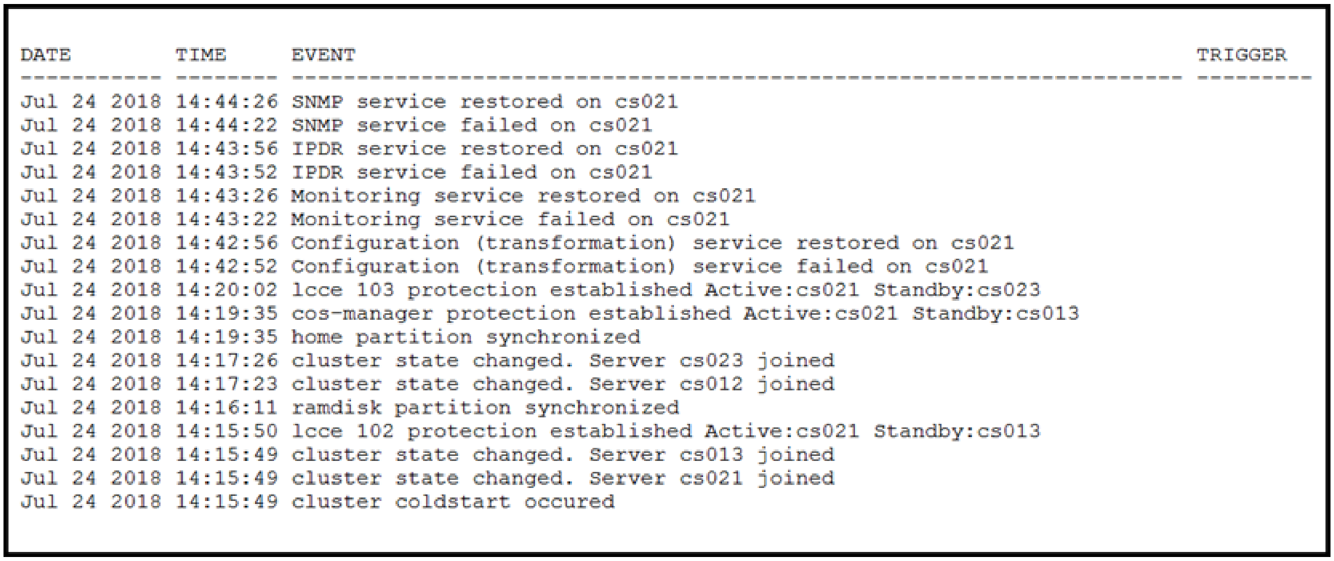
Usage guidelines

The command shows the information history of the cluster, such as the date, time and description of the events of the cluster.

The length of the event / log file is limited. After reaching the maximum size of 20 MB, a rotation is enabled and new events will overwrite the older events.

Examples

```
show cluster history
```



```
DATE        TIME     EVENT                                                                TRIGGER
----------- -------- --------------------------------------------------------------------- ---------
Jul 24 2018 14:44:26 SNMP service restored on cs021
Jul 24 2018 14:44:22 SNMP service failed on cs021
Jul 24 2018 14:43:56 IPDR service restored on cs021
Jul 24 2018 14:43:52 IPDR service failed on cs021
Jul 24 2018 14:43:26 Monitoring service restored on cs021
Jul 24 2018 14:43:22 Monitoring service failed on cs021
Jul 24 2018 14:42:56 Configuration (transformation) service restored on cs021
Jul 24 2018 14:42:52 Configuration (transformation) service failed on cs021
Jul 24 2018 14:20:02 lcce 103 protection established Active:cs021 Standby:cs023
Jul 24 2018 14:19:35 cos-manager protection established Active:cs021 Standby:cs013
Jul 24 2018 14:19:35 home partition synchronized
Jul 24 2018 14:17:26 cluster state changed. Server cs023 joined
Jul 24 2018 14:17:23 cluster state changed. Server cs012 joined
Jul 24 2018 14:16:11 ramdisk partition synchronized
Jul 24 2018 14:15:50 lcce 102 protection established Active:cs021 Standby:cs013
Jul 24 2018 14:15:49 cluster state changed. Server cs013 joined
Jul 24 2018 14:15:49 cluster state changed. Server cs021 joined
Jul 24 2018 14:15:49 cluster coldstart occured
```

Related information

clear cluster history

ha master move

rebalance lcce

show cluster status

show cluster status

Use the `show cluster status` command to display the current status of the COS-core cluster from a high availability point of view.

```
show cluster status
```

Syntax description

This command has no arguments or keywords.

Command mode

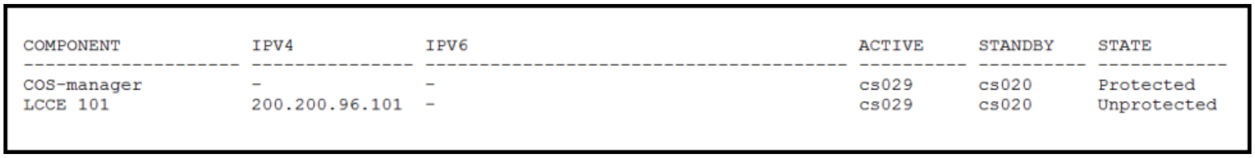
Exec mode.

Usage guidelines

Displays the protection state of the cluster components. A component is said to be HA protected if all component instances are configured and replicated.

Example

```
show cluster status
```



```
COMPONENT            IPV4            IPV6                                    ACTIVE     STANDBY    STATE
-------------------- --------------- --------------------------------------- ---------- ---------- ------------
COS-manager          -               -                                       cs029      cs020      Protected
LCCE 101             200.200.96.101  -                                       cs029      cs020      Unprotected
```

Output columns

Field	Description
Component	Component name.
IPv4	The IPv4 address of the component
IPv6	The IPv6 address of the component
Active	Server name with the active component.
Standby	Server name with backup components.
State	Protection state of component, with the following possible values:

Field	Description
	• Protected – Component is HA protected • Unprotected – Component is Unprotected

Related information

show cluster status verbose

show cluster summary

show cluster status verbose

Use the `show cluster status` command to provide info about active, standby cluster servers:

```
show cluster status verbose
```

Syntax description

This command has no arguments or keywords.

Command mode

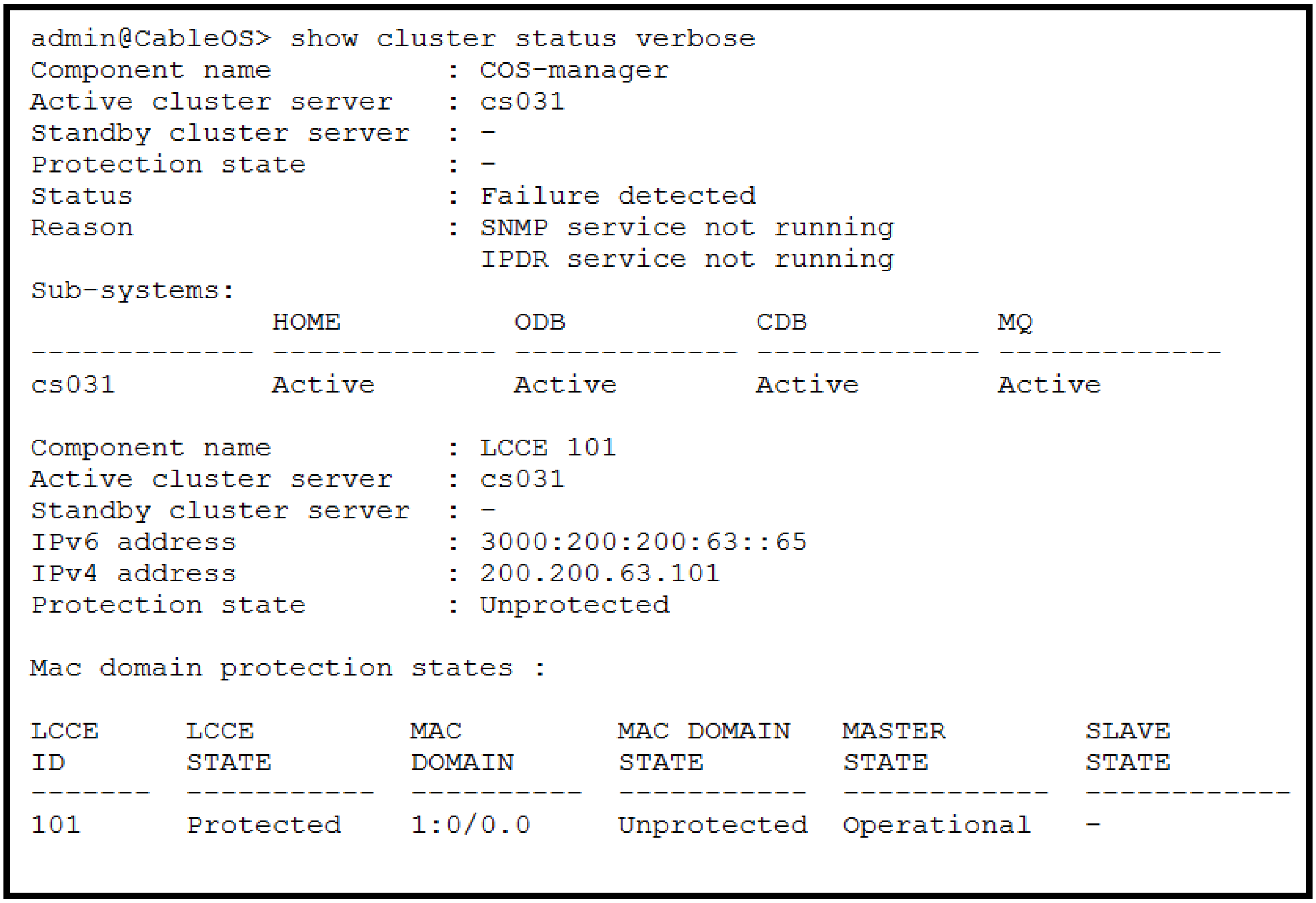
Exec mode.

Usage guidelines

This output from this command is divided into two parts:

- Information about COS-manager and sub-systems.
  - Information about active and standby cluster servers, showing either the node number or '-'.
  - Sub-systems shows detailed information about the main components for each node.
  - Sub-system : States (Possible outputs)
  - HOME PART: Synced or Unprotected*
  - ODB PART: Master, Synced, Unprotected, " - "
  - CDB PART: Master, Synced, Not Connected, " - "
  - MESSAGE QUEUE: Protected, Unprotected
- Information about every LCCE
  - Second part provides detailed Info about every LCCE component.

Examples



```
admin@CableOS> show cluster status verbose
Component name          : COS-manager
Active cluster server   : cs031
Standby cluster server  : -
Protection state        : -
Status                  : Failure detected
Reason                  : SNMP service not running
                          IPDR service not running
Sub-systems:
              HOME          ODB           CDB           MQ
------------- ------------- ------------- ------------- -------------
cs031         Active        Active        Active        Active

Component name          : LCCE 101
Active cluster server   : cs031
Standby cluster server  : -
IPv6 address            : 3000:200:200:63::65
IPv4 address            : 200.200.63.101
Protection state        : Unprotected

Mac domain protection states :

LCCE     LCCE         MAC         MAC DOMAIN   MASTER        SLAVE
ID       STATE        DOMAIN      STATE        STATE         STATE
-------  -----------  ----------  -----------  ------------  ------------
101      Protected    1:0/0.0     Unprotected  Operational   -
```

Related information

show cluster status

show cluster summary

show cluster summary

Use the `show cluster summary` command to display information about the resources on each server in the current cluster.

```
show cluster summary
```

Syntax description

This command has no arguments or keywords.

Command mode

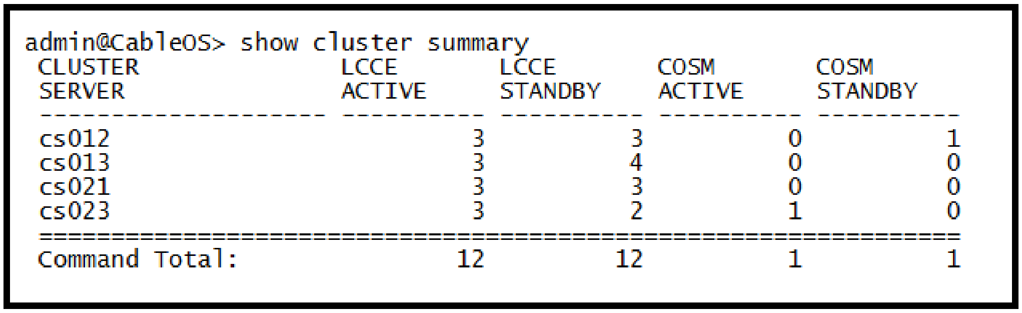
Exec mode.

Usage guidelines

The command shows information about active and standby LCCEs, and active and standby CSSMs for each server in the cluster.

Examples

```
show cluster summary
```



```
admin@CableOS> show cluster summary
 CLUSTER                  LCCE        LCCE        COSM        COSM
 SERVER                   ACTIVE      STANDBY     ACTIVE      STANDBY
 -------------------- ---------- ---------- ---------- ----------
 cs012                         3          3          0          1
 cs013                         3          4          0          0
 cs021                         3          3          0          0
 cs023                         3          2          1          0
 ================================================================
 Command Total:               12         12          1          1
```

Related information

show cluster status

show cluster status verbose

show cops servers

Use the `show cops servers` command to display information about active COPS servers.

```
show cops servers
```

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

The command shows information about COPS servers, such as policy server address, state, keep-alives, and policy client information.

Examples

```
show cops servers
```

Related information

debug packetcable cops

show csr

Use the `show csr` command to display a generated Certificate Signing Request (CSR) file.

`show csr` *csr filename* [`decode`]

Syntax description

csr filename	The generated certificate that bears the same file name as the stored CSR configuration file, but with the `*.csr` file suffix
decode	Shows the decoded CSR contents. This output is for information use only.

Default

This command has no default value.

Command mode

Exec mode.

Examples

The following example displays a generated CSR certificate stored in the CableOS Core server:

```
show csr csrconfigfile.csr
```

```

-----BEGIN CERTIFICATE REQUEST-----
MIIC6zCCAdMCAQAwZzELMAkGA1UEBhMCREUxDDAKBgNVBAgMA05SVzEUMBIGA1UE
BwwLRHVlc3NlbGRvcmYxFjAUBgNVBAoMDVZvZGFmb25lIEdtYkgxDTALBgNVBAsM
BFJVTFQxDTALBgNVBAMMBHRlc3QwggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEK
AoIBAQC7C66OWUPrKBnPrStwsi8PhVBKm6criUyZvSv7N3CnH8fHC3CARoo/Gv9q
hV97SoPcfNUhB4mA40LYc/olJNH1TJWIgGN8XCJvFDcay9eThlxGhU1Vrje489Ny
ZlDJah3jmQF5rdfNpSZrwhtxo2Fqlf1QfUGkOrTY0UhSS9UoPSlqxCzUxDjYWjxd
ynzfKwRe21+mBe4l99d4X8cQluAnY1onjyfpge2hlHl9kVJC+/WiZGXQQoqlqBAh
A1JZZwCm6YwFE9n3hRORd5vD+hKdccgaf6btja+7OHZnIXvcyVwLa1rwDw5P7oGQ
V1+NYLeMSxocXF3KlUnKET+rUJzJAgMBAAGgPzA9BgkqhkiG9w0BCQ4xMDAuMCwG
A1UdEQQlMCOCD3d3dy5leGFtcGxlLmNvbYIQd3d3Mi5leGFtcGxlLmNvbTANBgkq
```

```
hkiG9w0BAQ0FAAOCAQEAQU+kImLPHmQyoGO+u0k1J6QGedA9eCjgYRTQoPzEC4rK
fBg1IXcBJgGQ5/xSOtSATt44ZgAw9ZPbSI0nCbhTqTwZoXANc3Ep3ZQAj4q9tnQb
ydmDnhI+X0WCHmXLUpnGOvWfgjdGkJARlalF0fpLorNfXVbPBnM7AHK6qOHwzSnc
tlOHhExq9i7/ZRxnr3fi14n+MONj0JKIGQiNTvLvrBIOTI6wE5Fu81G9CubENOsi
dGBi3n60+eizFzK7tV6LKBnUe7gbq2GV07XY6qWFv/6gYkt/Qr9YaGeEA0ezmFUu
WE8ZXLJ6+4Y/tRaX2MdCPQ9sZw+9CZRLqZ4ZgfPymg==
-----END CERTIFICATE REQUEST-----
```

The following example displays a generated CSR decoded certificate stored in the CableOS Core server:

```
show csr csrconfigfile.csr decode
```

```
Certificate Request:
    Data:
        Version: 1 (0x0)
        Subject: C = UK, ST = CountyDell, L = MyTown, O = MyMedia, OU = Unit1, CN =
 Default, emailAddress = myemail@company.com
        Subject Public Key Info:
            Public Key Algorithm: rsaEncryption
                Public-Key: (2048 bit)
                Modulus:
                    00:db:05:c3:6f:08:49:e8:81:95:8e:7f:b5:d8:fd:
                    08:6d:24:17:62:7b:54:bb:e9:c4:e8:4a:17:76:1b:
                    6e:89:ff:09:fe:df:c2:8f:8e:b4:b5:38:2a:8b:cd:
                    4b:14:9e:a5:6f:a1:05:89:7a:c0:5b:72:1a:fd:09:
                    3d:1c:05:02:2c:84:0b:be:2d:15:9d:5b:26:88:71:
                    42:84:e8:8c:5b:39:36:e0:15:17:21:f1:c8:5f:ba:
                    13:f8:9f:bc:5c:92:64:55:15:8e:c0:6f:2b:28:a3:
                    d0:51:4a:8b:16:35:6c:c3:1f:d4:de:44:bf:52:ee:
                    e2:0d:9a:2a:c3:a3:0e:e2:0c:17:f8:3a:95:42:d7:
                    59:7f:5c:5a:98:74:41:8e:94:89:77:0c:46:a5:a2:
                    37:d7:a9:04:f9:40:3f:e3:f6:fa:bd:80:91:06:a4:
                    57:e5:f4:d5:2d:6c:ef:a2:b0:4c:f2:f8:c4:34:54:
                    b7:ba:bd:3a:83:e2:5e:6e:9e:b1:1b:cd:da:99:1b:
                    bd:62:93:fc:ff:1d:5f:15:0c:ba:99:23:95:e2:9d:
                    ff:f2:5c:85:d0:fc:38:6c:4d:76:7b:ce:61:70:04:
                    00:29:17:a4:f1:77:bb:e9:5c:0b:ed:07:71:52:0c:
                    6c:a7:b4:3b:ca:dc:04:f6:4a:cc:ae:6f:c0:28:b5:
                    4c:11
                Exponent: 65537 (0x10001)
        Attributes:
        Requested Extensions:
            X509v3 Subject Alternative Name:
                DNS:www.example.com, DNS:www2.example.com
    Signature Algorithm: sha512WithRSAEncryption
         31:d9:40:a1:9d:01:f2:57:45:48:cf:1b:61:6c:6c:09:74:0f:
         55:89:b3:ae:0e:d6:03:43:ec:a8:5c:05:2b:63:c7:b6:5d:80:
         17:70:26:30:89:25:70:11:3b:1d:ef:db:56:40:65:74:61:70:
         5f:12:9a:22:e9:73:72:8f:bd:8b:c1:3a:60:0d:81:5f:d5:ba:
         d3:ab:41:b1:5f:f4:29:16:85:7d:47:a4:47:a6:27:0c:6a:f8:
         aa:72:9d:03:8d:0f:6c:52:0d:e4:50:c2:9b:65:9b:14:4a:4f:
         d5:ae:0d:46:ad:fb:aa:f4:98:7e:fa:51:53:2e:5e:16:06:58:
         27:87:67:82:89:61:ad:cc:e4:e8:62:ad:28:78:57:1e:1b:f1:
         d8:f3:2f:42:ae:1b:9b:b9:e4:13:ac:b5:1e:b3:fb:0e:69:0e:
         96:f5:92:1e:af:c0:1b:ba:07:05:c9:83:cf:7c:82:41:7b:40:
         e3:6f:9d:1c:1f:ca:6c:ee:e9:dc:95:d8:11:e5:26:a1:7c:79:
         81:b2:99:3b:bf:66:ba:4b:7b:15:84:54:e7:ed:da:a5:51:ad:
         31:9d:33:09:15:57:a3:d9:9b:e6:5a:9d:d9:6d:ad:1d:08:0e:
         05:8e:0d:1a:cd:f1:c2:f4:eb:7a:bd:55:f1:10:9e:ef:5d:c9:
         79:36:47:ac
```

Related information

generate csr

install csr config

show dynamic-bonding-group

Use the show dynamic-bonding-group command to display information about upstream and downstream dynamic bonding groups.

```
show dynamic-bonding-group [{downstream | upstream}]
```

Command mode

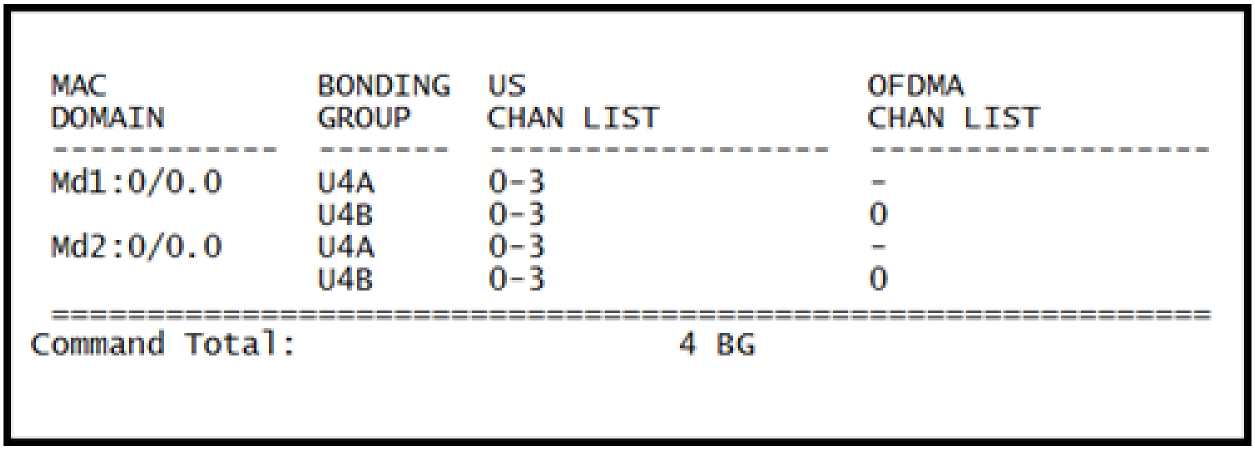
Exec mode.

Usage guidelines

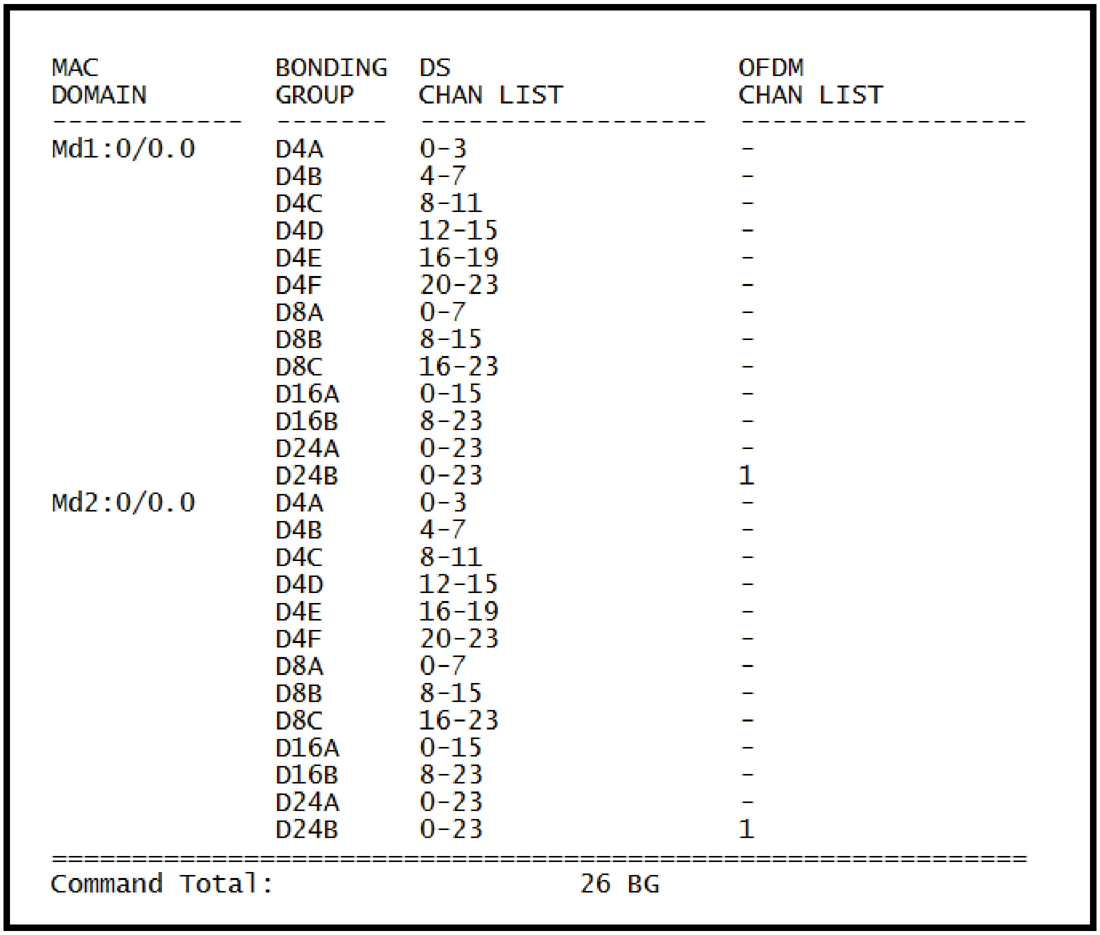
The command shows information about dynamic bonding groups, such its MAC Domain, the name of the bonding group, its channel list and its OFDMA channel list.

Examples

```
show dynamic-bonding-group upstream
```



```
  MAC             BONDING  US                   OFDMA
  DOMAIN          GROUP    CHAN LIST            CHAN LIST
  ------------    -------  ------------------   ------------------
  Md1:0/0.0       U4A      0-3                  -
                  U4B      0-3                  0
  Md2:0/0.0       U4A      0-3                  -
                  U4B      0-3                  0
  ==================================================================
Command Total:                     4 BG
```



```
MAC            BONDING   DS                   OFDM
DOMAIN         GROUP     CHAN LIST            CHAN LIST
------------   -------   ------------------   ------------------
Md1:0/0.0      D4A       0-3                  -
               D4B       4-7                  -
               D4C       8-11                 -
               D4D       12-15                -
               D4E       16-19                -
               D4F       20-23                -
               D8A       0-7                  -
               D8B       8-15                 -
               D8C       16-23                -
               D16A      0-15                 -
               D16B      8-23                 -
               D24A      0-23                 -
               D24B      0-23                 1
Md2:0/0.0      D4A       0-3                  -
               D4B       4-7                  -
               D4C       8-11                 -
               D4D       12-15                -
               D4E       16-19                -
               D4F       20-23                -
               D8A       0-7                  -
               D8B       8-15                 -
               D8C       16-23                -
               D16A      0-15                 -
               D16B      8-23                 -
               D24A      0-23                 -
               D24B      0-23                 1
==============================================================
Command Total:                     26 BG
```

show environment cable rpd

Use the `show environment cable rpd` command to show information about temperature and voltage sensors for RPDs. .

`show environment cable rpd` { *v-slot* | *rpd-ip* | *rpd-mac* } [`temperature` | `voltage`]

Syntax description

`v-slot`	See *CLI: Cable interface identifiers syntax* for more details.
`rpd-ip`	The IPv4 or IPv6 address of a specific RPD.
`rpd-mac`	The MAC address of a specific RPD.

Default

This command has no default value.

Command mode

Exec mode.

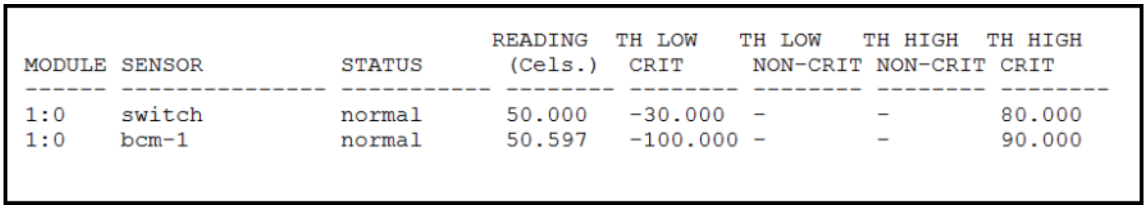
Usage guidelines

Equivalent to the `show cable rpd environment` command.

Examples

The example below shows the output for the RPD at node 1:0 for temperature.

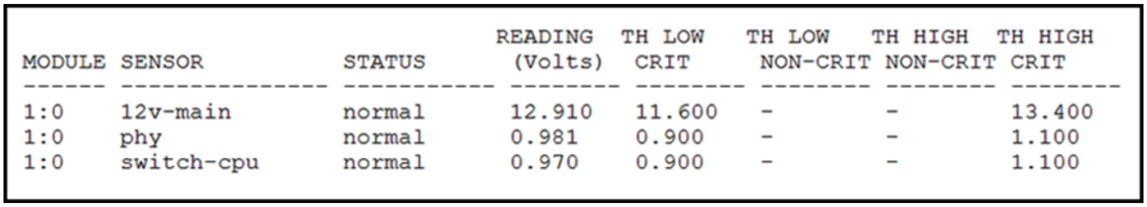
```
show environment cable rpd 1:0 temperature
```



```
                                  READING  TH LOW   TH LOW   TH HIGH  TH HIGH
MODULE SENSOR          STATUS      (Cels.)  CRIT     NON-CRIT NON-CRIT CRIT
------ --------------- ----------- -------- -------- -------- -------- --------
1:0    switch          normal      50.000   -30.000  -        -        80.000
1:0    bcm-1           normal      50.597   -100.000 -        -        90.000
```

The example below shows the output for the RPD at node 1:0 for voltage.

```
show environment cable rpd 1:0 voltage
```



```
                                  READING  TH LOW   TH LOW   TH HIGH  TH HIGH
MODULE SENSOR          STATUS      (Volts)  CRIT     NON-CRIT NON-CRIT CRIT
------ --------------- ----------- -------- -------- -------- -------- --------
1:0    12v-main        normal      12.910   11.600   -        -        13.400
1:0    phy             normal      0.981    0.900    -        -        1.100
1:0    switch-cpu      normal      0.970    0.900    -        -        1.100
```

Output columns for Temperature

Field	**Description**
Sensor	Name of the temperature sensor
Status	Status of the sensor. Possible options are: • Normal • Warning • Critical • Not present
Reading	Sensor voltage.
TH Low CRIT	The Low Threshold is critical. Below this value, the system may fail (critical state)
TH Low NON-CRIT	Low Non-Critical Threshold. The temperature is close to the Critical Threshold (warning state)

Field	Description
TH High NON-CRIT	High Non-Critical Threshold. The temperature is close to the Critical Threshold (warning state)
TH High CRIT	The High Threshold is critical. Above this value, the system may fail (critical state)

Output columns for Voltage

Field	Description
Sensor	Name of the voltage sensor
Status	Status of the sensor. Possible options are: • Normal • Warning • Critical • Not present
Reading	Sensor voltage.
TH Low CRIT	The Low Threshold is critical. Below this value, the system may fail (critical state)
TH Low NON-CRIT	Low Non-Critical Threshold. The voltage is close to the Critical Threshold (warning state)
TH High NON-CRIT	High Non-Critical Threshold. The voltage is close to the Critical Threshold (warning state)
TH High CRIT	The High Threshold is critical. Above this value, the system may fail (critical state)

show environment temperature

To show information about temperature sensors on the Core, use the `show environment temperature` command.

```
show environment temperature
```

Syntax description

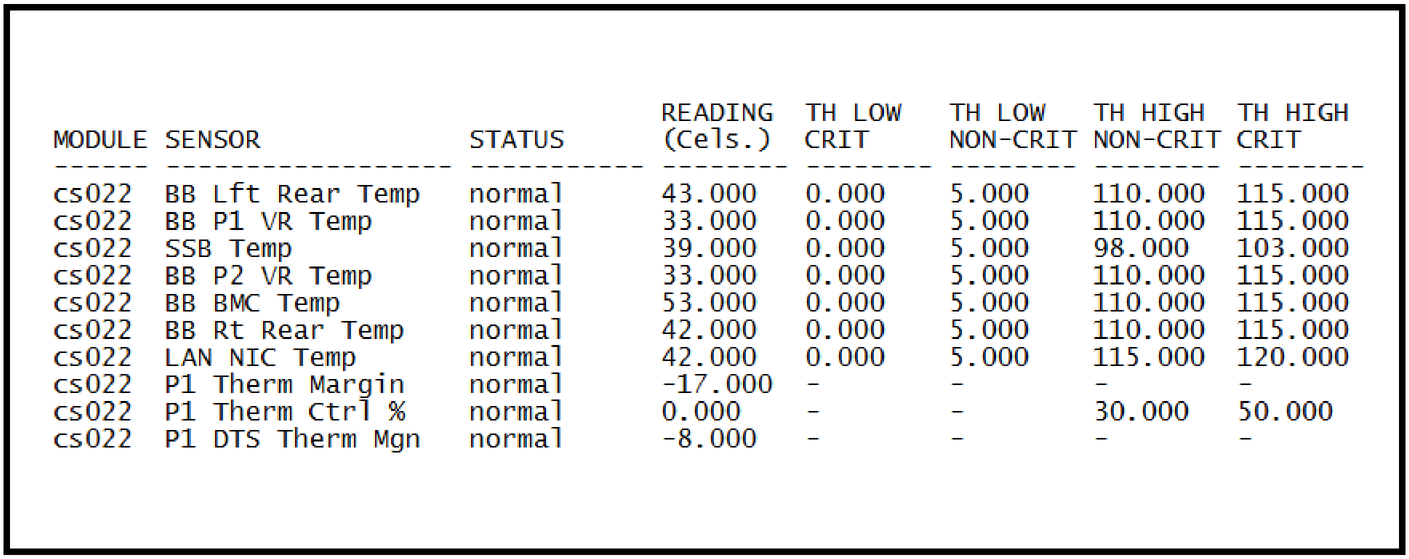
This command has no arguments or keywords.

Command mode

Exec mode.

Example

This example shows the output of the `show environment temperature` command.



```
                                      READING  TH LOW   TH LOW   TH HIGH  TH HIGH
MODULE SENSOR             STATUS      (Cels.)  CRIT     NON-CRIT NON-CRIT CRIT
------ ------------------ ----------- -------- -------- -------- -------- --------
cs022  BB Lft Rear Temp   normal      43.000   0.000    5.000    110.000  115.000
cs022  BB P1 VR Temp      normal      33.000   0.000    5.000    110.000  115.000
cs022  SSB Temp           normal      39.000   0.000    5.000    98.000   103.000
cs022  BB P2 VR Temp      normal      33.000   0.000    5.000    110.000  115.000
cs022  BB BMC Temp        normal      53.000   0.000    5.000    110.000  115.000
cs022  BB Rt Rear Temp    normal      42.000   0.000    5.000    110.000  115.000
cs022  LAN NIC Temp       normal      42.000   0.000    5.000    115.000  120.000
cs022  P1 Therm Margin    normal      -17.000  -        -        -        -
cs022  P1 Therm Ctrl %    normal      0.000    -        -        30.000   50.000
cs022  P1 DTS Therm Mgn   normal      -8.000   -        -        -        -
```

Output columns

Field	Description
Sensor	Name of the temperature sensor.
Status	Status of the sensor. Possible options are: • Normal • Warning • Critical • Not present
Reading	Sensor temperature.
TH Low CRIT	The Low Threshold is critical. Below that value, there might be a system failure (critical state).
TH Low NON-CRIT	Low Non Critical Threshold. The temperature is close to the Critical Threshold (warning state).
TH High NON-CRIT	High Non Critical Threshold. The temperature is close to the Critical Threshold (warning state).
TH High CRIT	The High Threshold is critical. Above that value, there might be a system failure (critical state).

Related information

show environment voltage

snmp-server monitor core sensor temperature threshold

show environment voltage

To show information about voltage sensors on the Core, use the `show environment voltage` command.

```
show environment voltage
```

Syntax description

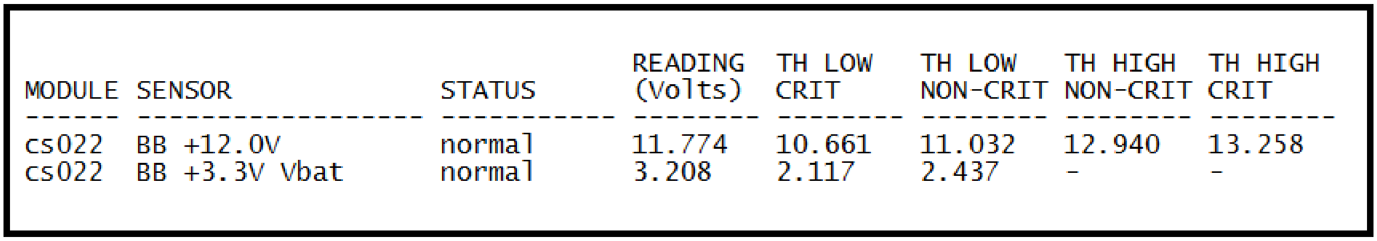
This command has no arguments or keywords.

Command mode

Exec mode.

Example

This example shows the output of the `show environment voltage` command.



```
                                              READING  TH LOW   TH LOW   TH HIGH  TH HIGH
MODULE SENSOR                  STATUS         (Volts)  CRIT     NON-CRIT NON-CRIT CRIT
------ ------------------- ------------ -------- -------- -------- -------- --------
cs022  BB +12.0V               normal         11.774   10.661   11.032   12.940   13.258
cs022  BB +3.3V Vbat           normal         3.208    2.117    2.437    -        -
```

Output columns

Field	Description
Sensor	Name of the voltage sensor.
Status	Status of the sensor. Possible options are: • Normal • Warning • Critical • Not present
Reading	Sensor voltage.
TH Low CRIT	The Low Threshold is critical. Below that value, there might be a system failure (critical state).
TH Low NON-CRIT	Low Non Critical Threshold. The voltage is close to the Critical Threshold (warning state).
TH High NON-CRIT	High Non Critical Threshold. The voltage is close to the Critical Threshold (warning state).
TH High CRIT	The High Threshold is critical. Above that value, there might be a system failure (critical state).

Related information

show environment temperature

snmp-server monitor core sensor voltage threshold

show history

Use the `show history` command to show the recent history.

`show history` *size*

Syntax description

size	The number of history entries to show.

Command mode

Exec mode.

Examples

The following example shows the last 20 history entries:

```
show history 20
```

Related information

history

show images

Use the `show images` command to show information about available software packages.

`show images`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

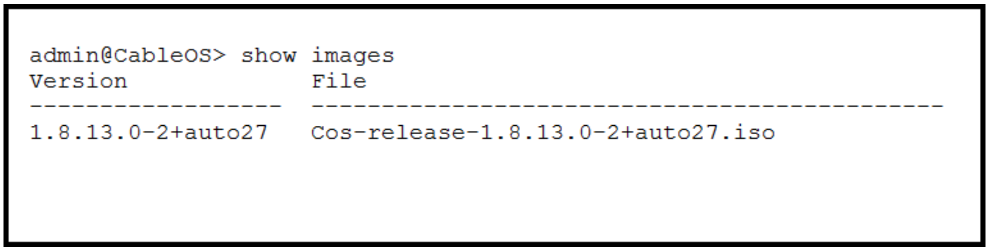
Usage guidelines

The command is used to see a list of available software image files, together with a description of their content.

Examples

The following example will display all information for the available software images.

```
show images
```



```
admin@CableOS> show images
Version               File
-------------------   ---------------------------------------------
1.8.13.0-2+auto27     Cos-release-1.8.13.0-2+auto27.iso
```

Related information

install
reboot passive all
show upgrade process
show version
show version cluster-server
show version cluster-server all
show version cluster-nic
reboot passive hitless
validate-iso-md5

show interface cable sid

Use the `show interface cable sid` command to display service identifier (SID) information for a cable modem.

```
show interface cable <usVC:VS/PP> sid
show interface cable <usVC:VS/PP> sid [ qos ]
```

Syntax description

<usVC:VS/PP>	Selects CMs belonging to ‘cable us-rf-port VC:VS/PP’.
<Service identification information number>	The service identification information number. The valid range is 1-8176.
`qos`	Displays the QoS characteristics received by each SID.

Command mode

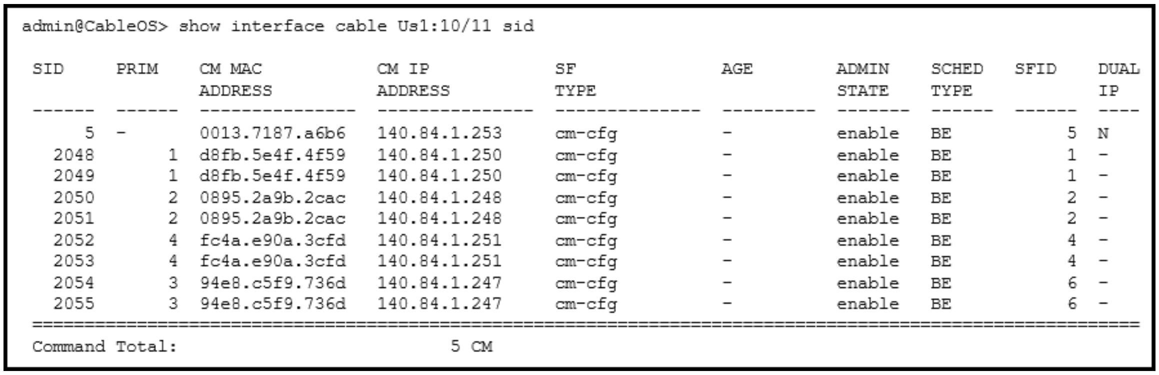
Exec mode.

Usage guidelines

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

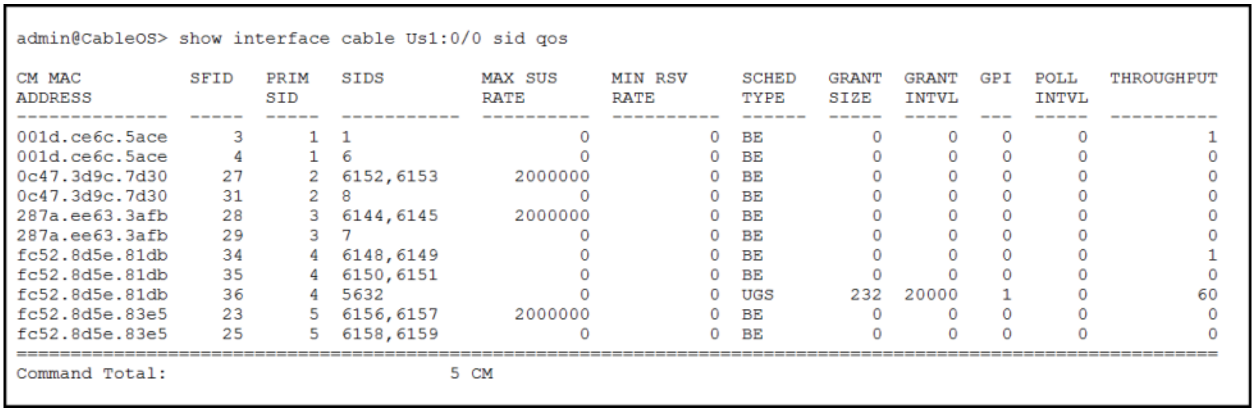
Example 1



```
admin@CableOS> show interface cable Us1:10/11 sid

 SID    PRIM   CM MAC          CM IP           SF             AGE       ADMIN   SCHED  SFID   DUAL
               ADDRESS         ADDRESS         TYPE                     STATE   TYPE          IP
 ------ ------ --------------- --------------- -------------- --------- ------- ------ ------ ----
      5 -      0013.7187.a6b6  140.84.1.253    cm-cfg         -         enable  BE          5 N
   2048      1 d8fb.5e4f.4f59  140.84.1.250    cm-cfg         -         enable  BE          1 -
   2049      1 d8fb.5e4f.4f59  140.84.1.250    cm-cfg         -         enable  BE          1 -
   2050      2 0895.2a9b.2cac  140.84.1.248    cm-cfg         -         enable  BE          2 -
   2051      2 0895.2a9b.2cac  140.84.1.248    cm-cfg         -         enable  BE          2 -
   2052      4 fc4a.e90a.3cfd  140.84.1.251    cm-cfg         -         enable  BE          4 -
   2053      4 fc4a.e90a.3cfd  140.84.1.251    cm-cfg         -         enable  BE          4 -
   2054      3 94e8.c5f9.736d  140.84.1.247    cm-cfg         -         enable  BE          6 -
   2055      3 94e8.c5f9.736d  140.84.1.247    cm-cfg         -         enable  BE          6 -
 =================================================================================================
 Command Total:                        5 CM
```

Field	Description
SID	Service Identification Number
PRIM	The primary service identifier (SID) assigned to the modem
CM MAC ADDRESS	The MAC address of the modem owning this SID
CM IP ADDRESS	The IP address of the modem owning this SID
SF TYPE	Displays the type of service flow. The supported types are: • cm-cfg: Static SF that was created by cm config file • dynamic(cmts): Dynamically created SF that was initiated by CMTS DSA • Dynamically created SF that was initiated by CM DSA
AGE	Period that the SID has been enabled
ADMIN STATE	Administrative state of the SID, where “disable” means that the SID has been turned off. “enable” is the normal state
SCHED TYPE	The service class schedule type, where: 2–Best-Effort Schedule Type 3–Non Real-Time Polling Service Schedule Type 4–Real-Time Polling Service Schedule Type 5–Unsolicited Grant Service with Activity Detection Schedule Type 6–Unsolicited Grant Service Schedule Type
SFID	Service flow identifier
DUAL IP	Identifies whether (“Y” or “N”) the CM or CPE supports both IPv4 and IPv6 addressing

Example 2



```
admin@CableOS> show interface cable Us1:0/0 sid qos

CM MAC          SFID   PRIM   SIDS         MAX SUS     MIN RSV     SCHED   GRANT  GRANT  GPI  POLL   THROUGHPUT
ADDRESS                SID                 RATE        RATE        TYPE    SIZE   INTVL       INTVL
--------------  -----  -----  -----------  ----------  ----------  ------  -----  -----  ---  -----  ----------
001d.ce6c.5ace      3      1  1                     0           0  BE          0      0    0      0           1
001d.ce6c.5ace      4      1  6                     0           0  BE          0      0    0      0           0
0c47.3d9c.7d30     27      2  6152,6153       2000000           0  BE          0      0    0      0           0
0c47.3d9c.7d30     31      2  8                     0           0  BE          0      0    0      0           0
287a.ee63.3afb     28      3  6144,6145       2000000           0  BE          0      0    0      0           0
287a.ee63.3afb     29      3  7                     0           0  BE          0      0    0      0           0
fc52.8d5e.81db     34      4  6148,6149             0           0  BE          0      0    0      0           1
fc52.8d5e.81db     35      4  6150,6151             0           0  BE          0      0    0      0           0
fc52.8d5e.81db     36      4  5632                  0           0  UGS       232  20000    1      0          60
fc52.8d5e.83e5     23      5  6156,6157       2000000           0  BE          0      0    0      0           0
fc52.8d5e.83e5     25      5  6158,6159             0           0  BE          0      0    0      0           0
===============================================================================================================
Command Total:                          5 CM
```

Field	Description
CM MAC ADDRESS	The MAC address of the modem owning this SID
SFID	Service flow identifier
PRIM SID	The primary service identifier (SID) assigned to the modem
SIDS	Service Identification Number
MAX SUS RATE	The maximum rate (0 to 4,294,967,295 bps)
MIN RSV RATE	The minimum guaranteed rate (0 to 4,294,967,295 bps)
SCHED TYPE	The service class schedule type, where: 2–Best-Effort Schedule Type 3–Non Real-Time Polling Service Schedule Type 4–Real-Time Polling Service Schedule Type 5–Unsolicited Grant Service with Activity Detection Schedule Type 6–Unsolicited Grant Service Schedule Type
GRANT SIZE	The grant size (0 to 65535 bytes)
GRANT INTVL	The grant interval (0 to 4294967295 microseconds)
GPI	The grants per interval (0 to 127 grants)
POLL INTVL	The poll interval (0 to 4294967295 microseconds)
THROUGHPUT	The overall throughput for this SID

show interface forwarding

Use the `show interface forwarding` command to display forwarding details.

`show interface` <*usVC:VS/PP/C*> `forwarding`

Syntax description

usVC:VS/PP/C	Selects CMs belonging to cable us-rf-port VC:VS/PP us-phy-channel C.

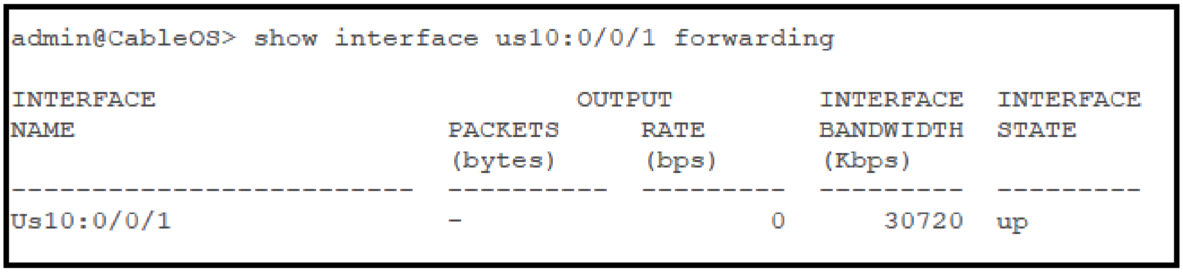
Default

This command has no default value.

Command mode

Exec mode.

Example



```
admin@CableOS> show interface us10:0/0/1 forwarding

INTERFACE                                   OUTPUT              INTERFACE  INTERFACE
NAME                           PACKETS      RATE                BANDWIDTH  STATE
                               (bytes)      (bps)               (Kbps)
-------------------------      ----------   ---------           ---------  ---------
Us10:0/0/1                     -                    0               30720  up
```

Output columns

Field	Description
INTERFACE NAME	The name of the interface.
OUTPUT PACKETS/ RATE	The cumulative packet output and the output rate.
INTERFACE BANDWIDTH	The total interface bandwidth allocated.
INTERFACE STATE	Whether the interface state is up or down.

show interface iuc-stat

Use the `show interface iuc-stat` command to display the IUC counters of a chosen upstream physical interface.

`show interface` [`cable-interface`] `iuc-stat`

Syntax description

cable-interface	The upstream physical interface <usVC:VS/PP/C> as defined in *CLI: Cable interface identifiers syntax*.

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

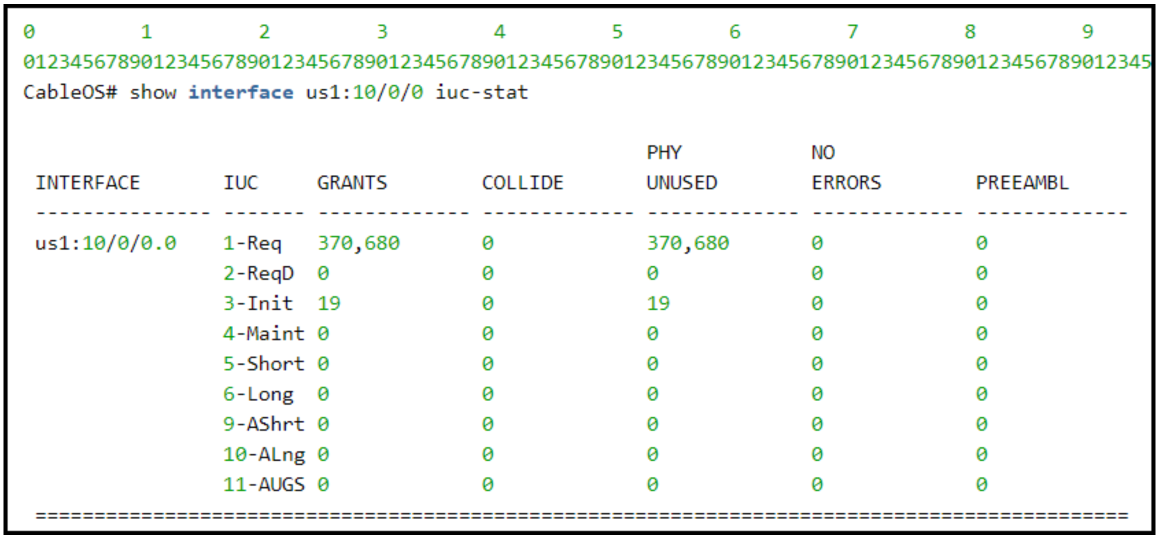
All interface counters are cleared on read of ANY of the tables.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ----------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ----------------------------------------------------------------------------
 x
```

Example

```
show interface us1:1/0/0 iuc-stat
```



```
0         1         2         3         4         5         6         7         8         9
012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345
CableOS# show interface us1:10/0/0 iuc-stat


                                                    PHY           NO
 INTERFACE       IUC     GRANTS        COLLIDE       UNUSED        ERRORS        PREEAMBL
 --------------- ------- ------------- ------------- ------------- ------------- -------------
 us1:10/0/0.0    1-Req   370,680       0             370,680       0             0
                 2-ReqD  0             0             0             0             0
                 3-Init  19            0             19            0             0
                 4-Maint 0             0             0             0             0
                 5-Short 0             0             0             0             0
                 6-Long  0             0             0             0             0
                 9-AShrt 0             0             0             0             0
                 10-ALng 0             0             0             0             0
                 11-AUGS 0             0             0             0             0
 =============================================================================================
```

show interface snr

Use the `show interface snr` command to display the SNR counters of a chosen upstream physical interface.

`show interface [ cable-interface ] snr`

Syntax description

`cable-interface`	The upstream physical interface <usVC:VS/PP/C>

Command mode

Exec mode.

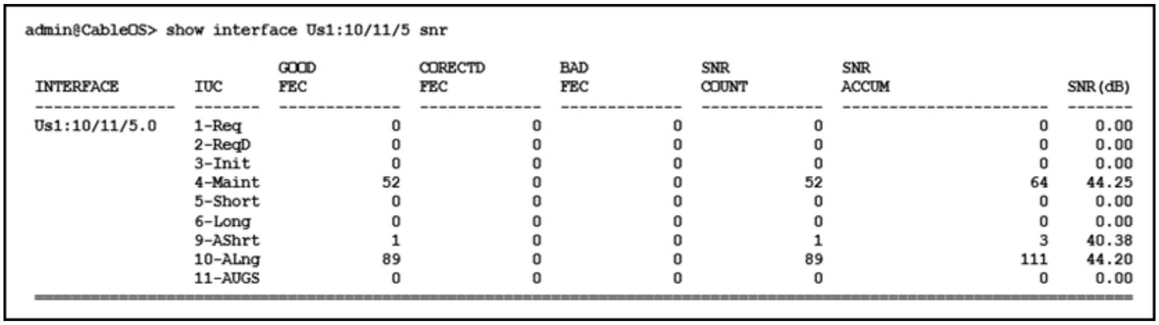
Usage guidelines

All interface counters are cleared on read of ANY of the tables.

IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later   |
x
 ---------------------------------------------------------------------------
 x
```

Example



```
admin@CableOS> show interface Us1:10/11/5 snr

                          GOOD           CORECTD        BAD            SNR            SNR
INTERFACE        IUC      FEC            FEC            FEC            COUNT          ACCUM                   SNR(dB)
---------------  -------  -------------  -------------  -------------  -------------  ----------------------  -------
Us1:10/11/5.0    1-Req                0              0              0              0                       0     0.00
                 2-ReqD               0              0              0              0                       0     0.00
                 3-Init               0              0              0              0                       0     0.00
                 4-Maint             52              0              0             52                      64    44.25
                 5-Short              0              0              0              0                       0     0.00
                 6-Long               0              0              0              0                       0     0.00
                 9-AShrt              1              0              0              1                       3    40.38
                 10-ALng             89              0              0             89                     111    44.20
                 11-AUGS              0              0              0              0                       0     0.00
=====================================================================================================================
```

Interface	**Interface name**
IUC	Interval usage code. The following IUC types are currently defined: <table><tr><th>Name</th><th>Value</th><th>Description</th></tr><tr><td>1-Req</td><td>1</td><td>Bandwidth Request</td></tr><tr><td>2-ReqD</td><td>2</td><td>Request/Data</td></tr><tr><td>3-Init</td><td>3</td><td>Initial Maintenance</td></tr><tr><td>4-Maint</td><td>4</td><td>Station Maintenance</td></tr><tr><td>5-Short</td><td>5</td><td>Short Grant</td></tr><tr><td>6-Long</td><td>6</td><td>Long Grant</td></tr><tr><td>9-AShrt</td><td>9</td><td>Advanced Phy Short Grant</td></tr><tr><td>10-ALng</td><td>10</td><td>Advanced Phy Long Grant</td></tr><tr><td>11-AUGS</td><td>11</td><td>Advanced Unsolicited Grant Service</td></tr></table>
GOOD FEC	Number of forward error correction (FEC) codewords received without error.
CORECTD FEC	Number of FEC codewords received with errors that could be corrected.
BAD FEC	Number of FEC codewords received with errors that could not be corrected.
SNR COUNT	Number of SNR reports based on which statistics are made.
SNR ACCUM	Accumulated SNR value
SNR (dB)	Average SNR value

show interfaces description

Use the `show interfaces description` command to show the description of interfaces.

`show interfaces` [`down-channel | ds-rf-port | ethernet | mac-domain | ofdm-channel | us-logical-channel | us-phy-channel | us-rf-port`] `description`

Syntax description

`show interfaces description` shows the description of all interfaces.

down-channel *dsVC:VS/PP/C*	Shows the description of downstream channels. *dsVC:VS/PP/C* optionally selects a single OFDM channel. If omitted, selects all downstream channels.
ds-rf-port *dsVC:VS/PP*	Shows the description of ds-rf-ports. *dsVC:VS/PP* optionally selects a single ds-rf-port. If omitted, selects all ds-rf-ports.
ethernet *dddd.dddd.dddd.dddd*	Shows the description of Ethernet interfaces belonging to all cores. *dddd.dddd.dddd.dddd* optionally selects all the Ethernet interfaces from a single core using its IP address, shown in the `show interfaces description` command. If omitted, selects all Ethernet interfaces.
mac-domain *mdVC:VS/PP.0*	Shows the description of MAC domains. *mdVC:VS/PP.0* optionally selects a single MAC domain. If omitted, selects all MAC domains.
ofdm-channel *OfVC:VS/PP/C*	Shows the description of OFDM channels. *OfVC:VS/PP/C* optionally selects a single OFDM channel. If omitted, selects all OFDM channels.
us-logical-channel *usVC:VS/PP/C.L*	Shows the description of us-logical-channels. *usVC:VS/PP/C.L* optionally selects a single us-logical-channel. If omitted, selects all us-logical-channels.
us-phy-channel *usVC:VS/PP/C*	Shows the description of us-phy-channels. *usVC:VS/PP/C* optionally selects a single us-phy-channel. If omitted, selects all us-phy-channels.
us-rf-port *usVC:VS/PP*	Shows the description of us-rf-ports. *usVC:VS/PP* optionally selects a single us-rf-port. If omitted, selects all us-rf-ports.

Command mode

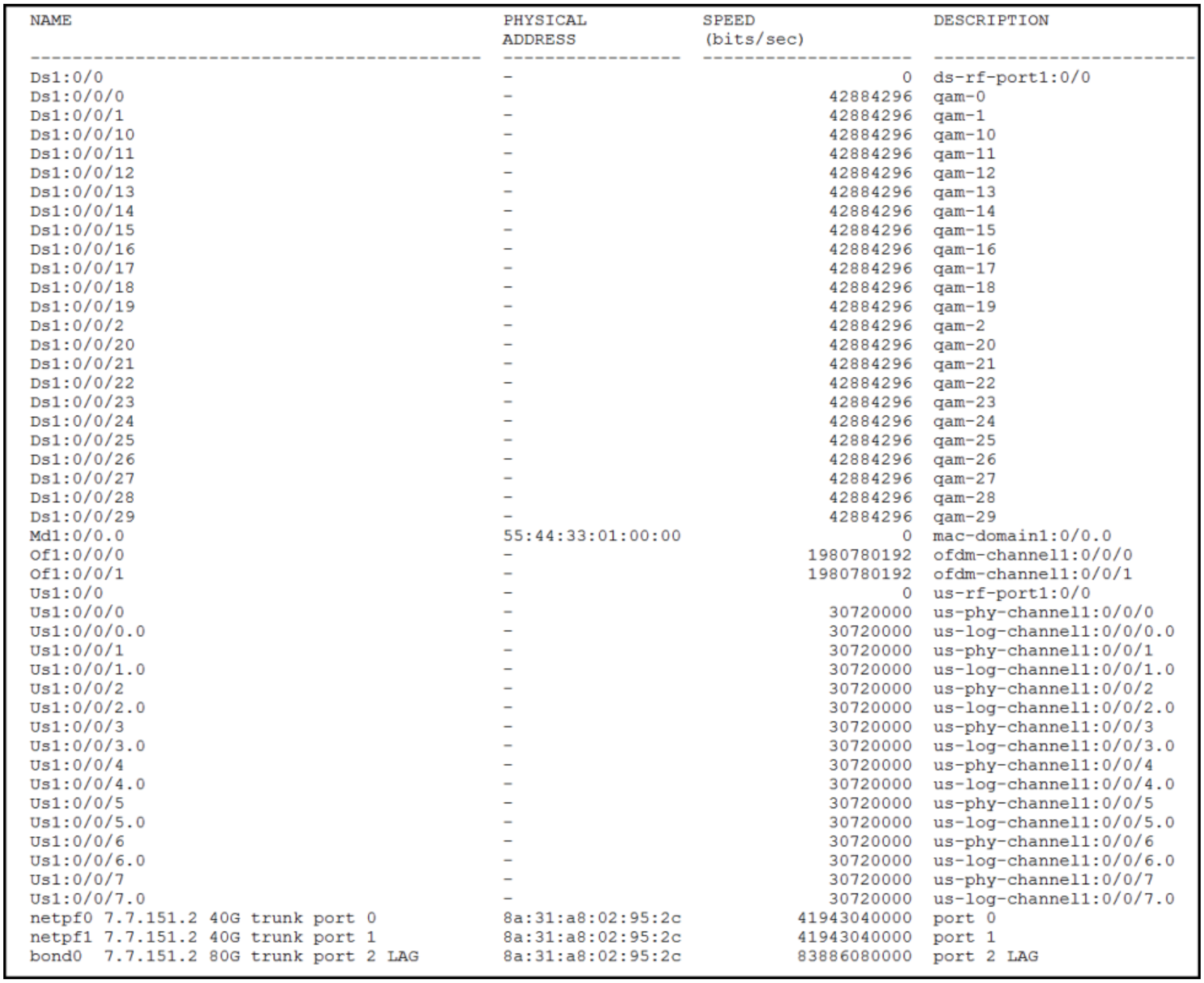
Exec mode.

Usage guidelines

The command is used to show the description of interfaces, including their name, physical address, speed, and description.

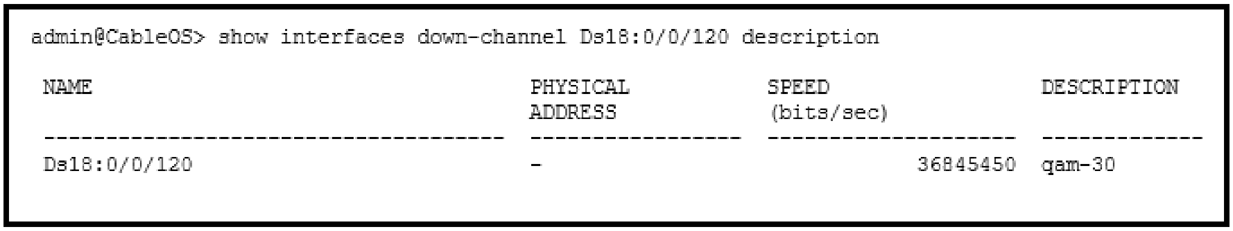
Examples

The following example displays the description of all interfaces:



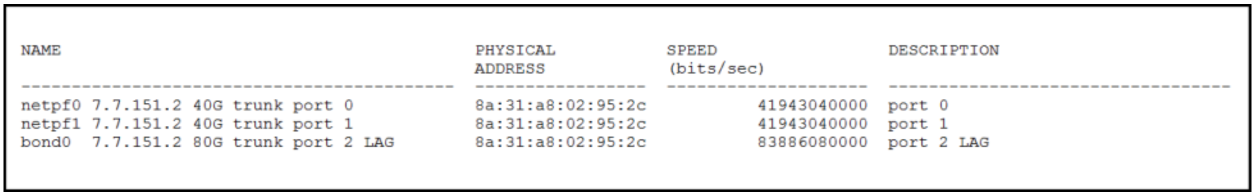
```
NAME                                         PHYSICAL           SPEED                DESCRIPTION
                                             ADDRESS            (bits/sec)
-------------------------------------------  -----------------  --------------------  -------------------------
Ds1:0/0                                      -                                     0  ds-rf-port1:0/0
Ds1:0/0/0                                    -                              42884296  qam-0
Ds1:0/0/1                                    -                              42884296  qam-1
Ds1:0/0/10                                   -                              42884296  qam-10
Ds1:0/0/11                                   -                              42884296  qam-11
Ds1:0/0/12                                   -                              42884296  qam-12
Ds1:0/0/13                                   -                              42884296  qam-13
Ds1:0/0/14                                   -                              42884296  qam-14
Ds1:0/0/15                                   -                              42884296  qam-15
Ds1:0/0/16                                   -                              42884296  qam-16
Ds1:0/0/17                                   -                              42884296  qam-17
Ds1:0/0/18                                   -                              42884296  qam-18
Ds1:0/0/19                                   -                              42884296  qam-19
Ds1:0/0/2                                    -                              42884296  qam-2
Ds1:0/0/20                                   -                              42884296  qam-20
Ds1:0/0/21                                   -                              42884296  qam-21
Ds1:0/0/22                                   -                              42884296  qam-22
Ds1:0/0/23                                   -                              42884296  qam-23
Ds1:0/0/24                                   -                              42884296  qam-24
Ds1:0/0/25                                   -                              42884296  qam-25
Ds1:0/0/26                                   -                              42884296  qam-26
Ds1:0/0/27                                   -                              42884296  qam-27
Ds1:0/0/28                                   -                              42884296  qam-28
Ds1:0/0/29                                   -                              42884296  qam-29
Md1:0/0.0                                    55:44:33:01:00:00                     0  mac-domain1:0/0.0
Of1:0/0/0                                    -                            1980780192  ofdm-channel1:0/0/0
Of1:0/0/1                                    -                            1980780192  ofdm-channel1:0/0/1
Us1:0/0                                      -                                     0  us-rf-port1:0/0
Us1:0/0/0                                    -                              30720000  us-phy-channel1:0/0/0
Us1:0/0/0.0                                  -                              30720000  us-log-channel1:0/0/0.0
Us1:0/0/1                                    -                              30720000  us-phy-channel1:0/0/1
Us1:0/0/1.0                                  -                              30720000  us-log-channel1:0/0/1.0
Us1:0/0/2                                    -                              30720000  us-phy-channel1:0/0/2
Us1:0/0/2.0                                  -                              30720000  us-log-channel1:0/0/2.0
Us1:0/0/3                                    -                              30720000  us-phy-channel1:0/0/3
Us1:0/0/3.0                                  -                              30720000  us-log-channel1:0/0/3.0
Us1:0/0/4                                    -                              30720000  us-phy-channel1:0/0/4
Us1:0/0/4.0                                  -                              30720000  us-log-channel1:0/0/4.0
Us1:0/0/5                                    -                              30720000  us-phy-channel1:0/0/5
Us1:0/0/5.0                                  -                              30720000  us-log-channel1:0/0/5.0
Us1:0/0/6                                    -                              30720000  us-phy-channel1:0/0/6
Us1:0/0/6.0                                  -                              30720000  us-log-channel1:0/0/6.0
Us1:0/0/7                                    -                              30720000  us-phy-channel1:0/0/7
Us1:0/0/7.0                                  -                              30720000  us-log-channel1:0/0/7.0
netpf0 7.7.151.2 40G trunk port 0            8a:31:a8:02:95:2c           41943040000  port 0
netpf1 7.7.151.2 40G trunk port 1            8a:31:a8:02:95:2c           41943040000  port 1
bond0  7.7.151.2 80G trunk port 2 LAG        8a:31:a8:02:95:2c           83886080000  port 2 LAG
```

The following example displays the description of a specific downstream channel:



```
admin@CableOS> show interfaces down-channel Ds18:0/0/120 description

 NAME                                      PHYSICAL          SPEED                  DESCRIPTION
                                           ADDRESS           (bits/sec)
 ----------------------------------------- ----------------- ---------------------- -------------
 Ds18:0/0/120                              -                             36845450   qam-30
```

The following example displays the descriptions for a specific Ethernet channel:



```
NAME                                         PHYSICAL           SPEED                DESCRIPTION
                                             ADDRESS            (bits/sec)
-------------------------------------------- -----------------  -------------------- ----------------------------------
netpf0 7.7.151.2 40G trunk port 0            8a:31:a8:02:95:2c           41943040000 port 0
netpf1 7.7.151.2 40G trunk port 1            8a:31:a8:02:95:2c           41943040000 port 1
bond0  7.7.151.2 80G trunk port 2 LAG        8a:31:a8:02:95:2c           83886080000 port 2 LAG
```

Related information

show interfaces status

show interfaces status

Use the `show interfaces status` command to show the administrative and operational status of all interfaces.

`show interfaces` [`down-channel` | `ds-rf-port` | `ethernet` | `mac-domain` | `ofdm-channel` | `us-logical-channel` | `us-phy-channel` | `us-rf-port`] `status`

Syntax description

down-channel *dsVC:VS/PP/C*	Shows the administrative and operational status of downstream channels. *dsVC:VS/PP/C* optionally selects a single OFDM channel. If omitted, selects all downstream channels.
ds-rf-port *dsVC:VS/PP*	Shows the administrative and operational status of ds-rf-ports. *dsVC:VS/PP* optionally selects a single ds-rf-port. If omitted, selects all ds-rf-ports.
ethernet *dddd.dddd.dddd.dddd*	Shows the administrative and operational status of Ethernet interfaces belonging to all cores. *dddd.dddd.dddd.dddd* optionally selects all the Ethernet interfaces from a single core using its IP address, shown in the `show interfaces status` command. If omitted, selects all Ethernet interfaces.
mac-domain *mdVC:VS/PP.0*	Shows the administrative and operational status of MAC domains.

	mdVC:VS/PP.0 optionally selects a single MAC domain. If omitted, selects all MAC domains.
ofdm-channel *OfVC:VS/PP/C*	Shows the administrative and operational status of OFDM channels. *OfVC:VS/PP/C* optionally selects a single OFDM channel. If omitted, selects all OFDM channels.
us-logical-channel *usVC:VS/PP/C.L*	Shows the administrative and operational status of us-logical-channels. *usVC:VS/PP/C.L* optionally selects a single us-logical-channel. If omitted, selects all us-logical-channels.
us-phy-channel *usVC:VS/PP/C*	Shows the administrative and operational status of us-phy-channels. *usVC:VS/PP/C* optionally selects a single us-phy-channel. If omitted, selects all us-phy-channels.
us-rf-port *usVC:VS/PP*	Shows the administrative and operational status of us-rf-ports. *usVC:VS/PP* optionally selects a single us-rf-port. If omitted, selects all us-rf-ports.

Command mode

Exec mode.

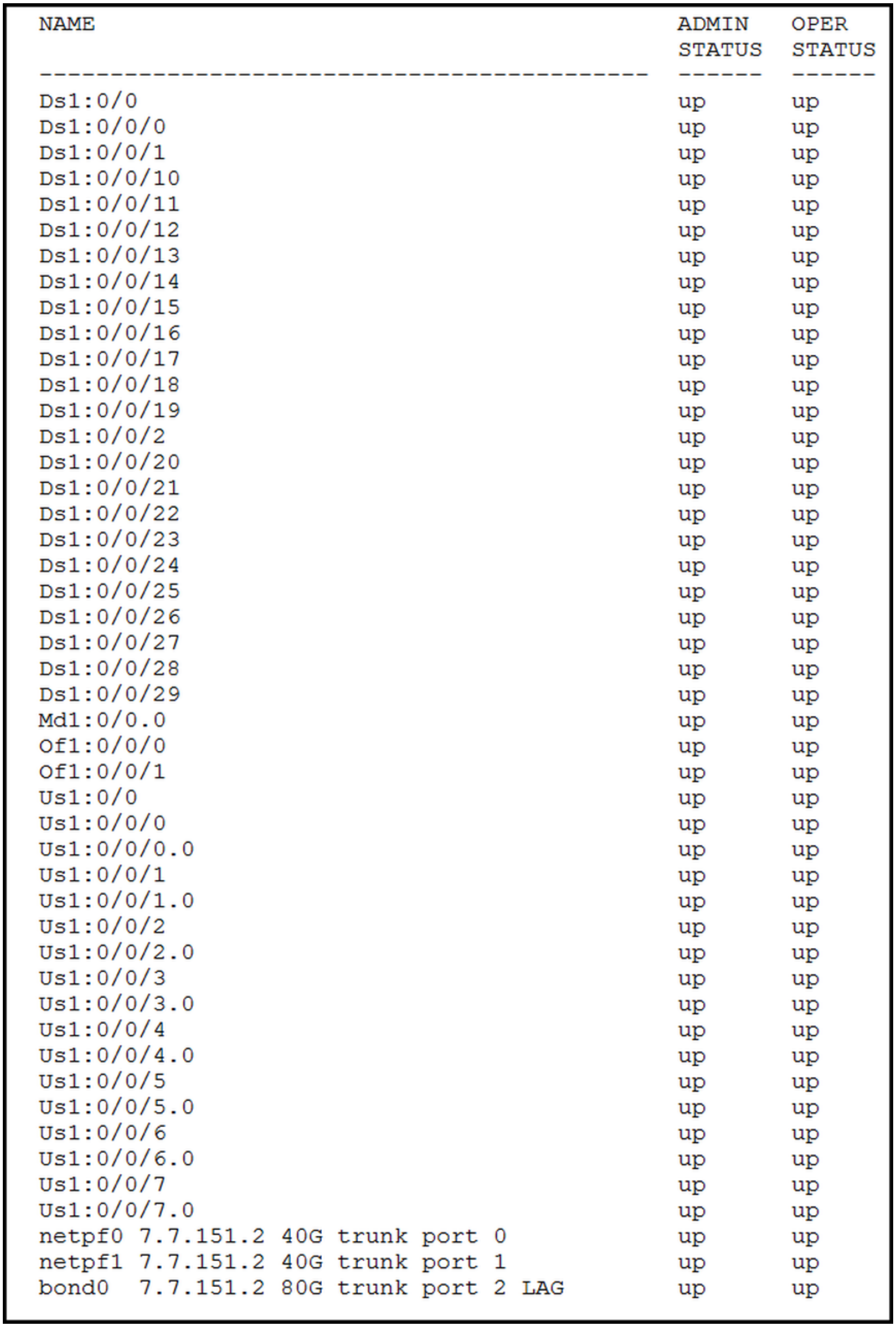
Usage guidelines

The command is used to show the status of interfaces.

Example

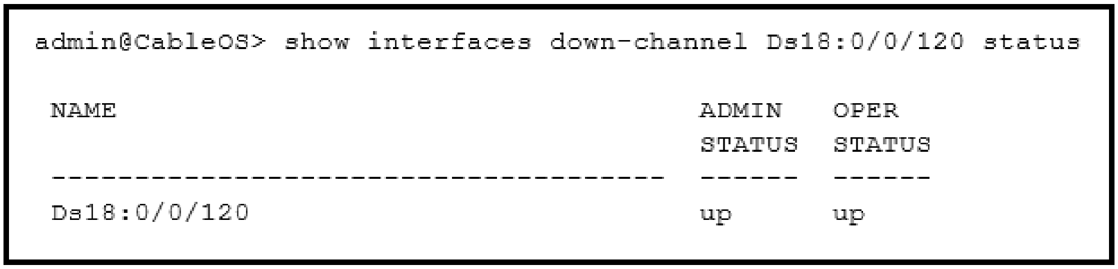
The following example displays the status of all interfaces:

```
show interfaces status
```



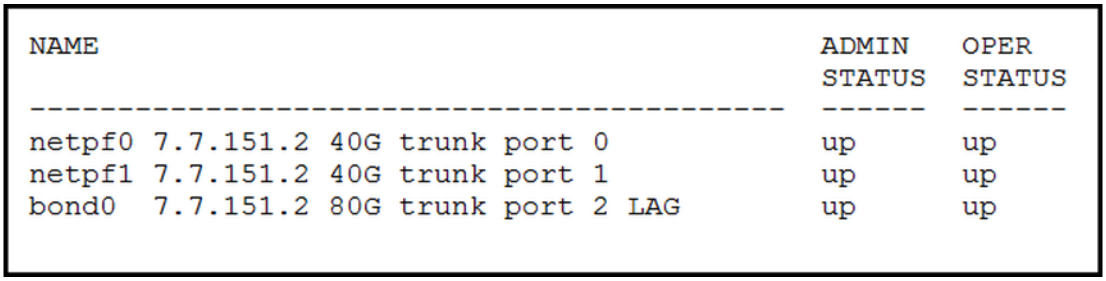
```
NAME                                         ADMIN   OPER
                                             STATUS  STATUS
-------------------------------------------  ------  ------
Ds1:0/0                                      up      up
Ds1:0/0/0                                    up      up
Ds1:0/0/1                                    up      up
Ds1:0/0/10                                   up      up
Ds1:0/0/11                                   up      up
Ds1:0/0/12                                   up      up
Ds1:0/0/13                                   up      up
Ds1:0/0/14                                   up      up
Ds1:0/0/15                                   up      up
Ds1:0/0/16                                   up      up
Ds1:0/0/17                                   up      up
Ds1:0/0/18                                   up      up
Ds1:0/0/19                                   up      up
Ds1:0/0/2                                    up      up
Ds1:0/0/20                                   up      up
Ds1:0/0/21                                   up      up
Ds1:0/0/22                                   up      up
Ds1:0/0/23                                   up      up
Ds1:0/0/24                                   up      up
Ds1:0/0/25                                   up      up
Ds1:0/0/26                                   up      up
Ds1:0/0/27                                   up      up
Ds1:0/0/28                                   up      up
Ds1:0/0/29                                   up      up
Md1:0/0.0                                    up      up
Of1:0/0/0                                    up      up
Of1:0/0/1                                    up      up
Us1:0/0                                      up      up
Us1:0/0/0                                    up      up
Us1:0/0/0.0                                  up      up
Us1:0/0/1                                    up      up
Us1:0/0/1.0                                  up      up
Us1:0/0/2                                    up      up
Us1:0/0/2.0                                  up      up
Us1:0/0/3                                    up      up
Us1:0/0/3.0                                  up      up
Us1:0/0/4                                    up      up
Us1:0/0/4.0                                  up      up
Us1:0/0/5                                    up      up
Us1:0/0/5.0                                  up      up
Us1:0/0/6                                    up      up
Us1:0/0/6.0                                  up      up
Us1:0/0/7                                    up      up
Us1:0/0/7.0                                  up      up
netpf0 7.7.151.2 40G trunk port 0            up      up
netpf1 7.7.151.2 40G trunk port 1            up      up
bond0  7.7.151.2 80G trunk port 2 LAG        up      up
```

The following example displays the status of a specific downstream channel:



```
admin@CableOS> show interfaces down-channel Ds18:0/0/120 status

 NAME                                    ADMIN   OPER
                                         STATUS  STATUS
 --------------------------------------  ------  ------
 Ds18:0/0/120                            up      up
```

The following example displays the status for a specific Ethernet channel:



```
NAME                                         ADMIN   OPER
                                             STATUS  STATUS
-------------------------------------------  ------  ------
netpf0 7.7.151.2 40G trunk port 0            up      up
netpf1 7.7.151.2 40G trunk port 1            up      up
bond0  7.7.151.2 80G trunk port 2 LAG        up      up
```

Related information

show interfaces description

show inventory core

To display the physical inventory information for Core hardware, use the `show inventory core` command.

`show inventory core [ core name ]`

Syntax description

`core name`	The name of the specific Core for which you want to display information.

Command mode

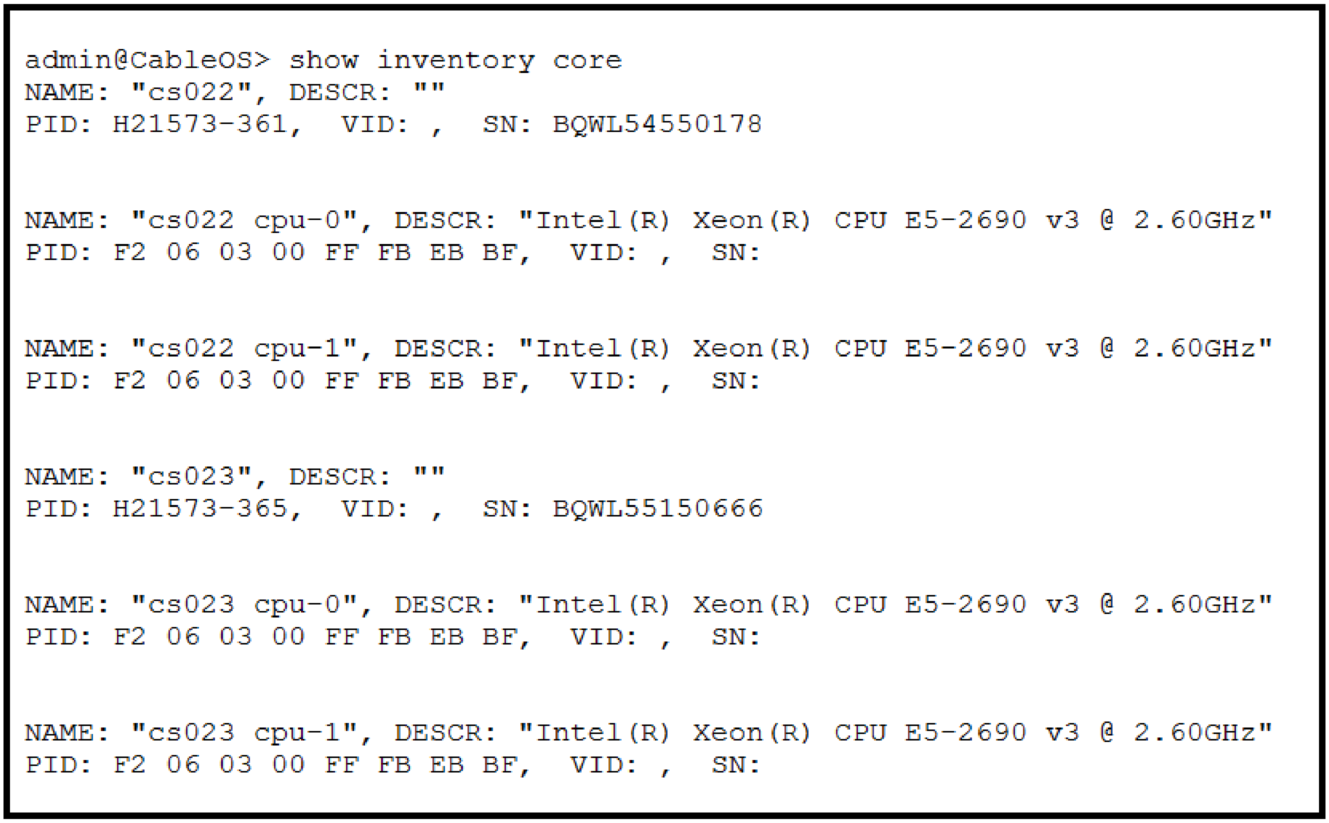
Exec mode.

Usage guidelines

N/A

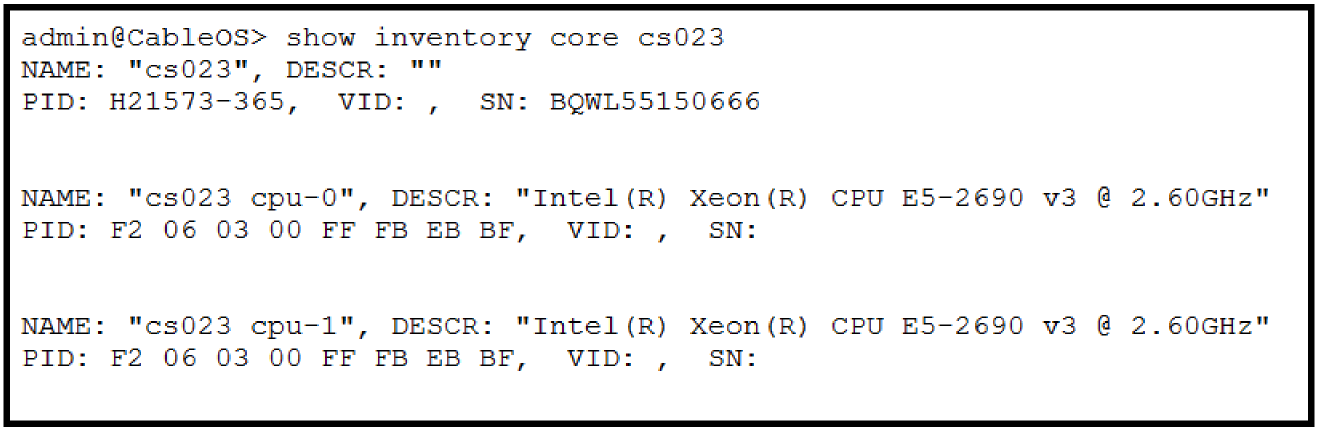
Examples

This example shows the output of a generic `show inventory core` command.



```
admin@CableOS> show inventory core
NAME: "cs022", DESCR: ""
PID: H21573-361,  VID: ,  SN: BQWL54550178


NAME: "cs022 cpu-0", DESCR: "Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz"
PID: F2 06 03 00 FF FB EB BF,  VID: ,  SN:


NAME: "cs022 cpu-1", DESCR: "Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz"
PID: F2 06 03 00 FF FB EB BF,  VID: ,  SN:


NAME: "cs023", DESCR: ""
PID: H21573-365,  VID: ,  SN: BQWL55150666


NAME: "cs023 cpu-0", DESCR: "Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz"
PID: F2 06 03 00 FF FB EB BF,  VID: ,  SN:


NAME: "cs023 cpu-1", DESCR: "Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz"
PID: F2 06 03 00 FF FB EB BF,  VID: ,  SN:
```

It is also possible to select a specific Core by name or IP address. In this case, only information for the specific core will be displayed.



```
admin@CableOS> show inventory core cs023
NAME: "cs023", DESCR: ""
PID: H21573-365,  VID: ,  SN: BQWL55150666


NAME: "cs023 cpu-0", DESCR: "Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz"
PID: F2 06 03 00 FF FB EB BF,  VID: ,  SN:


NAME: "cs023 cpu-1", DESCR: "Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz"
PID: F2 06 03 00 FF FB EB BF,  VID: ,  SN:
```

For each Core there are three entries. The first shows information about the Core's motherboard. The other two entries show information about the Core's two processors.

Output columns

Field	**Description**
NAME	The name of the Core
DESCR	The short description of the Core

Field	**Description**
PID	Vendor type
VID	Hardware revision
SN	Serial number

Related information

show inventory rpd

show inventory rpd

To display the physical inventory information for RPD hardware, use the `show inventory rpd` command.

`show inventory rpd [ { ip address | mac address | slot id } ]`

Syntax description

`ip address	mac address	slot id`	The identifier of the specific RPD for which you want to display information.

Command mode

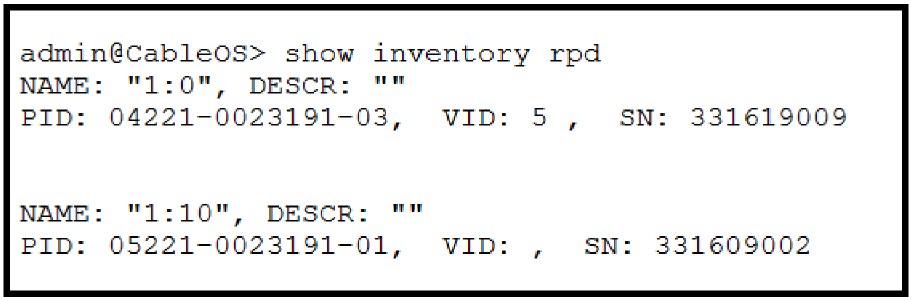
Exec mode.

Usage guidelines

There are no Usage Guidelines for this command.

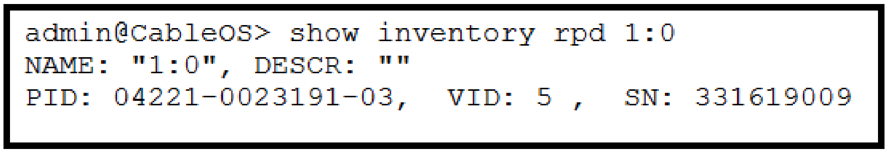
Examples

This example shows the output of a generic `show inventory rpd` command.



```
admin@CableOS> show inventory rpd
NAME: "1:0", DESCR: ""
PID: 04221-0023191-03,  VID: 5 ,  SN: 331619009


NAME: "1:10", DESCR: ""
PID: 05221-0023191-01,  VID: ,  SN: 331609002
```

It is possible to select a specific RPD by its IP address, MAC address or slot id. In this case only information for the specific RPD will be displayed.



```
admin@CableOS> show inventory rpd 1:0
NAME: "1:0", DESCR: ""
PID: 04221-0023191-03,  VID: 5 ,  SN: 331619009
```

Output columns

Field	Description
NAME	The name of the Core
DESCR	The short description of the Core
PID	Vendor type
VID	Hardware revision
SN	Serial number

Related information

show inventory core

show ipdr collector

Use the `show ipdr collector` command to display the list of sessions with which the Collector is associated and the data statistics for the sessions.

`show ipdr collector` *collector_name*

Syntax description

collector_name	The Collector name.

Command mode

Exec mode.

Usage guidelines

You can use the `show ipdr collector` command to display IPDR diagnostic events. The table below shows the corresponding IPDR/SP events and IDs.

Event	IPDR/SP message	ID
IPDR_EVENT_COLLECTOR_CONNECTED	CONNECT	0x05
IPDR_EVENT_SERVER_CONNECTED	CONNECT_RESPONSE	0x06
IPDR_EVENT_DISCONNECT	DISCONNECT	0x07
IPDR_EVENT_FLOW_START	FLOW_START	0x01
IPDR_EVENT_FLOW_STOP	FLOW_STOP	0x03
IPDR_EVENT_SESSION_START	SESSION_START	0x08
IPDR_EVENT_SESSION_STOP	SESSION_STOP	0x09
IPDR_EVENT_KEEP_ALIVE	KEEP_ALIVE	0x40
IPDR_EVENT_TEMPLATE_DATA	TEMPLATE_DATA	0x10
IPDR_EVENT_MODIFY_TEMPLATE	MODIFY_TEMPLATE	0x1a

Event	IPDR/SP message	ID
IPDR_EVENT_MODIFY_TEMPLATE_RESPONSE	MODIFY_TEMPLATE_RESPONSE	0x1b
IPDR_EVENT_FINAL_TEMPLATE_DATA_ACK	FINAL_TEMPLATE_DATA_ACK	0x13
IPDR_EVENT_START_NEGOTIATION	START_NEGOTIATION	0x1d
IPDR_EVENT_START_NEGOTIATION_REJECT	START_NEGOTIATION_REJECT	0x1e
IPDR_EVENT_GET_SESSIONS	GET_SESSIONS	0x14
IPDR_EVENT_GET_SESSIONS_RESPONSE	GET_SESSIONS_RESPONS	0x15
IPDR_EVENT_GET_TEMPLATES	GET_TEMPLATES	0x16
IPDR_EVENT_GET_TEMPLATES_RESPONSE	GET_TEMPLATES_RESPONSE	0x17
IPDR_EVENT_DATA	DATA	0x20
IPDR_EVENT_DATA_ACK	DATA_ACK	0x21
IPDR_EVENT_REQUEST	REQUEST	0x30
IPDR_EVENT_RESPONSE	RESPONSE	0x31
IPDR_EVENT_ERROR	ERROR	0x23

These events also have an indication of their origin: INCOMING (from the CMTS to the Collector) and OUTGOING (from the Collector to the CMTS).

Diagnostic events are also recorded in the log file (/var/log/cosmipdrexporterd or show log local <node> cosmipdrexporterd). All events have severity INFO, except DATA/DATA_ACK (severity DEBUG to prevent flooding) and ERROR (severity ERROR). By default, IPDR log messages with severity INFO and higher are forwarded to syslog.

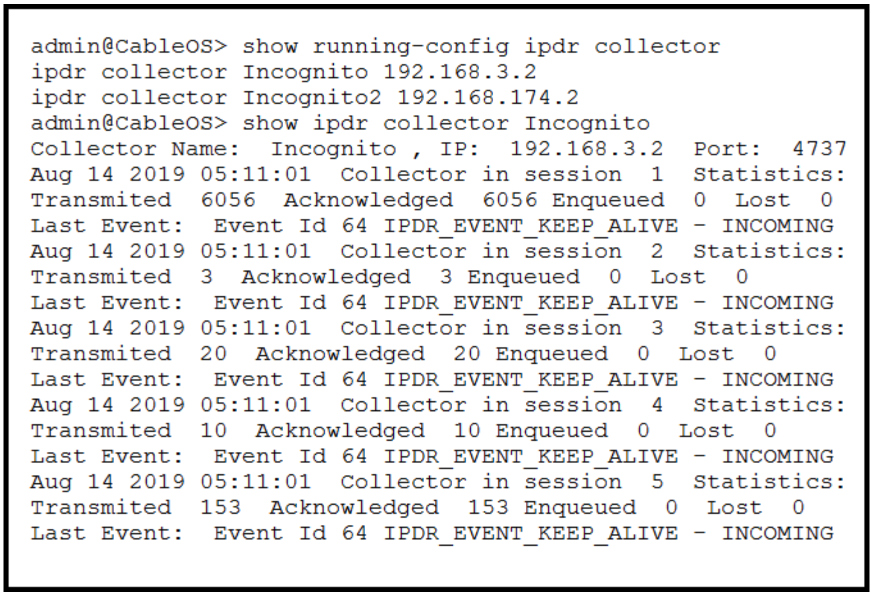
Severity thresholds in the log file can be adjusted via a debug CLI command `unhide debug` followed by logging local <node> cosmipdrexporterd <params>.

Severity threshold in the terminal and remote syslog server can be adjusted via config entries logging monitor and logging syslog respectively.

Examples

The following example displays the sessions associated with a Collector named Incognito.

```
show ipdr collector Incognito
```



```
admin@CableOS> show running-config ipdr collector
ipdr collector Incognito 192.168.3.2
ipdr collector Incognito2 192.168.174.2
admin@CableOS> show ipdr collector Incognito
Collector Name:  Incognito , IP:  192.168.3.2  Port:  4737
Aug 14 2019 05:11:01  Collector in session  1  Statistics:
Transmited  6056  Acknowledged  6056 Enqueued  0  Lost  0
Last Event:  Event Id 64 IPDR_EVENT_KEEP_ALIVE - INCOMING
Aug 14 2019 05:11:01  Collector in session  2  Statistics:
Transmited  3  Acknowledged  3 Enqueued  0  Lost  0
Last Event:  Event Id 64 IPDR_EVENT_KEEP_ALIVE - INCOMING
Aug 14 2019 05:11:01  Collector in session  3  Statistics:
Transmited  20  Acknowledged  20 Enqueued  0  Lost  0
Last Event:  Event Id 64 IPDR_EVENT_KEEP_ALIVE - INCOMING
Aug 14 2019 05:11:01  Collector in session  4  Statistics:
Transmited  10  Acknowledged  10 Enqueued  0  Lost  0
Last Event:  Event Id 64 IPDR_EVENT_KEEP_ALIVE - INCOMING
Aug 14 2019 05:11:01  Collector in session  5  Statistics:
Transmited  153  Acknowledged  153 Enqueued  0  Lost  0
Last Event:  Event Id 64 IPDR_EVENT_KEEP_ALIVE - INCOMING
```

Related information

ipdr associate

ipdr collector

ipdr exporter

ipdr session

ipdr template

ipdr type

show ipdr exporter

show ipdr session

show ipdr exporter

Use the `show ipdr exporter` command to display information about the state of the IPDR Exporter.

`show ipdr exporter`

Syntax description

This command has no arguments or keywords.

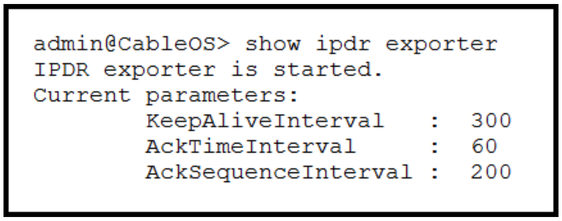
Command mode

Exec mode.

Example

The following example shows the status of the IPDR Exporter.

```
show ipdr exporter
```



```
admin@CableOS> show ipdr exporter
IPDR exporter is started.
Current parameters:
        KeepAliveInterval   :  300
        AckTimeInterval     :  60
        AckSequenceInterval :  200
```

Output columns

Field	Description
KeepAliveInterval	The Keep Alive timer in seconds
AckTimeInterval	The Acknowledged records timeout in seconds
AckSequenceInterval	The maximum number of unacknowledged records

Related information

ipdr associate

ipdr collector

ipdr exporter

ipdr session

ipdr template

ipdr type

show ipdr collector

show ipdr session

show ipdr session

Use the `show ipdr session` command to display the list of sessions and session details.

`show ipdr session{all | session-id}`

Syntax description

`session_id`	An integer representing the unique IPDR session ID.

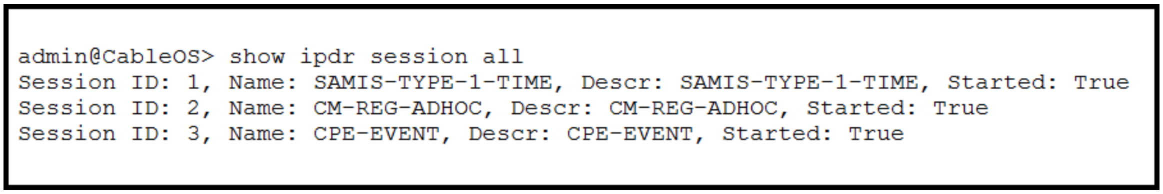
Command mode

Exec mode.

Examples

The following example displays the status of all IPDR sessions.

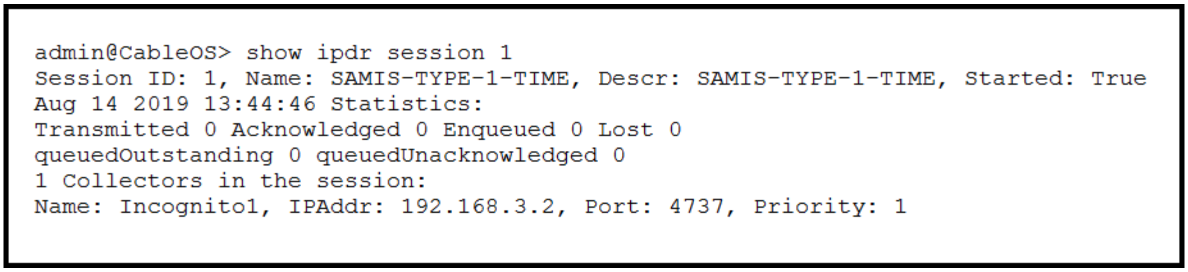
```
show ipdr session all
```



```
admin@CableOS> show ipdr session all
Session ID: 1, Name: SAMIS-TYPE-1-TIME, Descr: SAMIS-TYPE-1-TIME, Started: True
Session ID: 2, Name: CM-REG-ADHOC, Descr: CM-REG-ADHOC, Started: True
Session ID: 3, Name: CPE-EVENT, Descr: CPE-EVENT, Started: True
```

The following example displays the status of IPDR session 1.

```
show ipdr session 1
```



```
admin@CableOS> show ipdr session 1
Session ID: 1, Name: SAMIS-TYPE-1-TIME, Descr: SAMIS-TYPE-1-TIME, Started: True
Aug 14 2019 13:44:46 Statistics:
Transmitted 0 Acknowledged 0 Enqueued 0 Lost 0
queuedOutstanding 0 queuedUnacknowledged 0
1 Collectors in the session:
Name: Incognito1, IPAddr: 192.168.3.2, Port: 4737, Priority: 1
```

Related information

ipdr associate

ipdr collector

ipdr exporter

ipdr session

ipdr template

ipdr type

show ipdr collector

show ipdr exporter

show lcce

Use the `show lcce` command to display the mapping between LCCEs and their corresponding MAC domains.

`show lcce [ lcce_ip ]`

Syntax description

`lcce_ip`	The IP address of a specific LCCE.

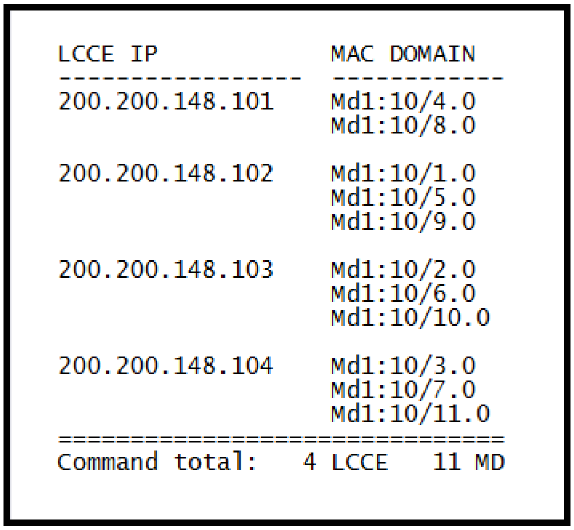
Command mode

Exec mode.

Examples

The following example will display the LCCE topology for all LCCEs:

```
show lcce
```



```
LCCE IP              MAC DOMAIN
-----------------    ------------
200.200.148.101      Md1:10/4.0
                     Md1:10/8.0

200.200.148.102      Md1:10/1.0
                     Md1:10/5.0
                     Md1:10/9.0

200.200.148.103      Md1:10/2.0
                     Md1:10/6.0
                     Md1:10/10.0

200.200.148.104      Md1:10/3.0
                     Md1:10/7.0
                     Md1:10/11.0
===============================
Command total:    4 LCCE    11 MD
```

Related information

show cable modem lcce

show lcce summary

show lcce summary

Use the `show lcce summary` command to display how many MAC domains are contained in each LCCE.

`show lcce summary`

Syntax description

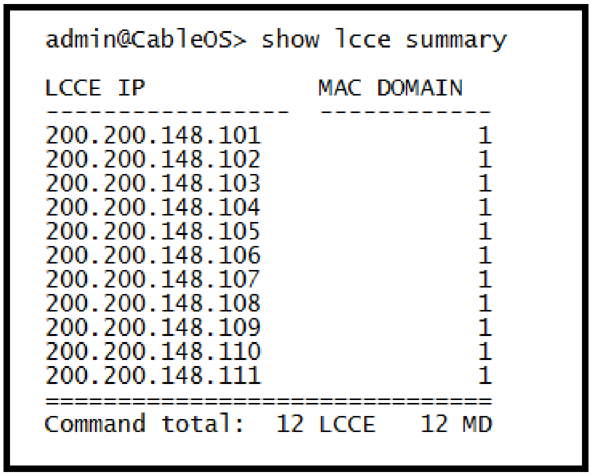
This command has no arguments or keywords.

Command mode

Exec mode.

Examples

```
show lcce summary
```



```
admin@CableOS> show lcce summary

LCCE IP              MAC DOMAIN
------------------   ------------
200.200.148.101                 1
200.200.148.102                 1
200.200.148.103                 1
200.200.148.104                 1
200.200.148.105                 1
200.200.148.106                 1
200.200.148.107                 1
200.200.148.108                 1
200.200.148.109                 1
200.200.148.110                 1
200.200.148.111                 1
=================================
Command total:  12 LCCE    12 MD
```

Related information

show cable modem lcce

show lcce

show log

Use the `show log command` to display the contents of the circular buffered log file.

`show log`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

This command displays the entire log.

Examples

The following example will display the log:

```
show log
```

For more information about logging message severity, see *Logging*.

Related information

logging buffered

show log local

Use the `show log local` command to display the contents of the local log file for a specific service and cluster.

`show log local` *hostname service-name*

Syntax description

`hostname`	The hostname of the cluster server where the service is running.
`service-name`	The name of the service. Different cluster servers may run different lists of services. The following services can be shown: • cosdepid – DEPI service • cosmaaad – Auth, Admit, Account service • cosmcfgd – Config service • cosmclid – CLI service • cosmevtd – User Event service • cosmgcpd – GCP service • cosmipdrexporterd – IPDR service • cosmmond – Monitoring (Stats) service • cosmpktcd – Packetcable service • cosmsnmpd – SNMP service • ulcmulpid – MULPI service • ulcsched – Upstream scheduler • ulcusppd – Data Path process

Command mode

Exec mode.

Usage guidelines

This command enables you to show only the log information in which you are interested.

Examples

The following example shows the log for service cosmsnmpd on cluster server node-1:

```
show log node-1 cosmsnmpd
```

For more information about logging message severity, see *Logging*.

Related information

logging local

show log summary

Use the `show log summary` command to show a summary of the number of each type of log event for each of the components within the system.

`show log summary` [*address*]

Syntax description

address	Enter the address of the Core or an RPD or RPS to get information only for that specific component.

Default

This command has no default value.

Command mode

Exec mode.

Examples

This example will show a summary of the entire system:

```
show log summary
```

This example will show a summary for the specific device at the given address:

```
show log summary 1234.6789.abcd 1.1.1.1
```

show packetcable cms

Use the `show packetcable cms` command to display information about active CMC/PS servers.

`show packetcable cms`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

This command displays information about active CMC/PS servers, such as the GC-Address, the GC-Port, Client-Addr, and so on. To display additional information, use `show packetcable cms verbose.`

Examples

The following example will display information about active CMC/PS servers:

```
show packetable cms
```

Related information

packetcable

show packetcable gate

Use the `show packetcable gate` command to display information about a specific gate.

`show packetcable gate` *gateid*

Syntax description

gateid	The gate identifier.

Command mode

Exec mode.

Usage guidelines

Displays detailed information about a single gate. The gate identifier can be found by using the `show packetcable gate summary` command.

Examples

The following example will display all information about a gate with the id of 10:

```
show packetcable gate 10
```

Related information

packetcable

show packetcable gate summary

show packetcable gate summary

Use the `show packetcable gate summary` command to display summary information about all packetcable gates.

`show packetcable gate summary`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

This command shows summary information for all existing PacketCable gates, such as GateID, SubscriberID, State, Type, and so on.

Examples

The following example will display summary information about all gates:

```
show packetcable gate summary
```

Related information

packetcable

show packetcable gate

show packetcable global

Use the `show packetcable global` command to display global PacketCable configuration data.

`show packetcable global`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

Use this command to verify the global PacketCable configuration.

Examples

The following example will display the PacketCable global configuration data:

```
show packetcable global
```

Related information

packetcable

show packetcable log

Use the `show packetcable log` command to display logs from the PacketCable module.

`show packetcable log`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

This command displays the logs from the PacketCable module.

Examples

The following example displays the PacketCable logs:

```
show packetcable logs
```

Related information

packetcable

show rpn alarms

Use the `show rpn alarms` command to display DS power alarm information of the RPN. The command outputs DS Power alarm threshold values and statuses.

`show rpn` [{ *v-slot ip mac* }] `alarms`

Syntax description

v-slot	The chassis and slot of the RPN to be displayed.
ip	The IP address of the RPN to be displayed.
mac	The MAC address of the RPN to be displayed.

Command mode

Exec mode.

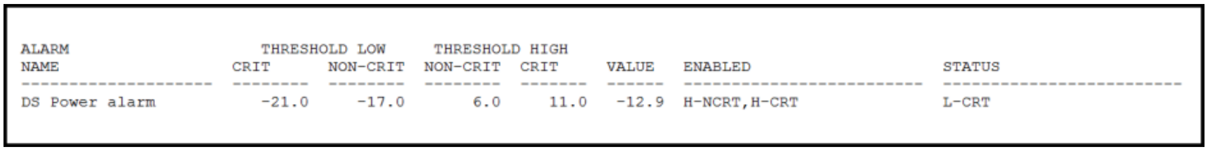
Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example will display the alarms of the RPN at slot 1:0

```
show rpn 1:0 alarms
```



```
ALARM                    THRESHOLD LOW     THRESHOLD HIGH
NAME                  CRIT      NON-CRIT  NON-CRIT  CRIT     VALUE   ENABLED                    STATUS
--------------------  --------  --------  --------  -------  ------  -------------------------  -------------------------
DS Power alarm           -21.0     -17.0       6.0     11.0   -12.9  H-NCRT,H-CRT               L-CRT
```

Output columns

Field	**Description**
Alarm Name	The name of the alarm
Threshold Low Crit	Lower critical threshold
Threshold Low Non Crit	Lower non-critical threshold
Threshold High Non Crit	Higher non-critical threshold
Threshold High Crit	Higher critical threshold
Value	The current value
Enabled	This column shows which thresholds are enabled. This column may contain one or more of the following values: • L-CRT – Lower critical • L-NCRT – Lower non-critical • H-NCRT – Higher non-critical • H-CRT – Higher critical
Status	Displays the alarms status

show rpn config

Use the `show rpn config` command to display the configuration of a single RPN.

`show rpn` [{ *v-slot ip mac* }] `config`

Syntax description

v-slot	The chassis and slot of the RPN to be displayed.
ip	The IP address of the RPN to be displayed.
mac	The MAC address of the RPN to be displayed.

Command mode

Exec mode.

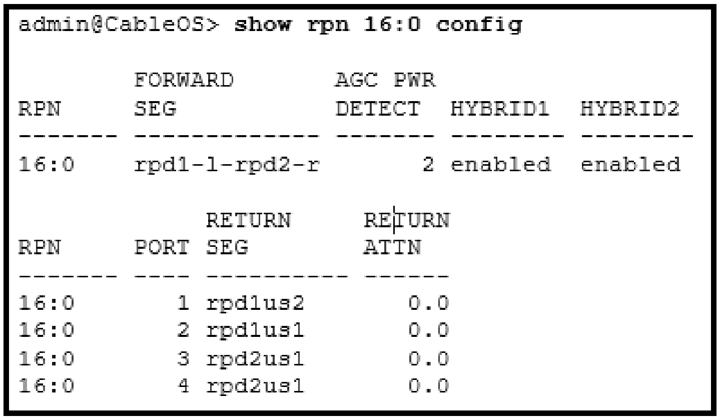
Usage guidelines

There are no additional Usage Guidelines for this command.

Example

The following example displays the configuration of the RPN at slot 16:0

```
show rpn 16:0 config
```



```
admin@CableOS> show rpn 16:0 config

        FORWARD       AGC PWR
RPN     SEG           DETECT  HYBRID1  HYBRID2
------- ------------- ------- -------- --------
16:0    rpd1-1-rpd2-r       2 enabled  enabled

             RETURN     RETURN
RPN     PORT SEG        ATTN
------- ---- ---------- ------
16:0       1 rpd1us2       0.0
16:0       2 rpd1us1       0.0
16:0       3 rpd2us1       0.0
16:0       4 rpd2us1       0.0
```

Related information

show rpn verbose

show rpn environment

set rpn

show rpn environment

Use the `show rpn environment` command to display the status of the RPN's power and temperature measurements.

`show rpn` [{ *v-slot ip mac* }] `environment`

Syntax description

v-slot	The chassis and slot of the RPN to be displayed.
ip	The IP address of the RPN to be displayed.
mac	The MAC address of the RPN to be displayed.

Command mode

Exec mode.

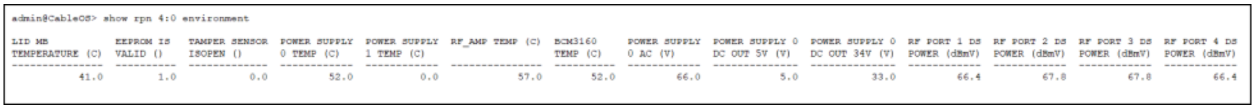
Usage guidelines

There are no additional Usage Guidelines for this command.

Example

The following example displays the environment measurements of the RPN at slot 4:0

```
show rpn 4:0 environment
```



```
admin@CableOS> show rpn 4:0 environment

LID MB           EEPROM IS  TAMPER SENSOR  POWER SUPPLY  POWER SUPPLY  RF_AMP TEMP (C)  BCM3160    POWER SUPPLY  POWER SUPPLY 0  POWER SUPPLY 0  RF PORT 1 DS  RF PORT 2 DS  RF PORT 3 DS  RF PORT 4 DS
TEMPERATURE (C)  VALID ()   ISOPEN ()      0 TEMP (C)    1 TEMP (C)                     TEMP (C)   0 AC (V)      DC OUT 5V (V)   DC OUT 34V (V)  POWER (dBmV)  POWER (dBmV)  POWER (dBmV)  POWER (dBmV)
---------------  ---------  -------------  ------------  ------------  ---------------  ---------  ------------  --------------  --------------  ------------  ------------  ------------  ------------
           41.0        1.0            0.0          52.0           0.0             57.0       52.0          66.0             5.0            33.0          66.4          67.8          67.8          66.4
```

Related information

show rpn config

show rpn verbose

show rpn verbose

Use the `show rpn verbose` command to display the aggregate of the lid and power show commands.

`show rpn` [{ *v-slot ip mac* }] `verbose`

Syntax description

v-slot	The chassis and slot of the RPN to be displayed.
ip	The IP address of the RPN to be displayed.
mac	The MAC address of the RPN to be displayed.

Command mode

Exec mode.

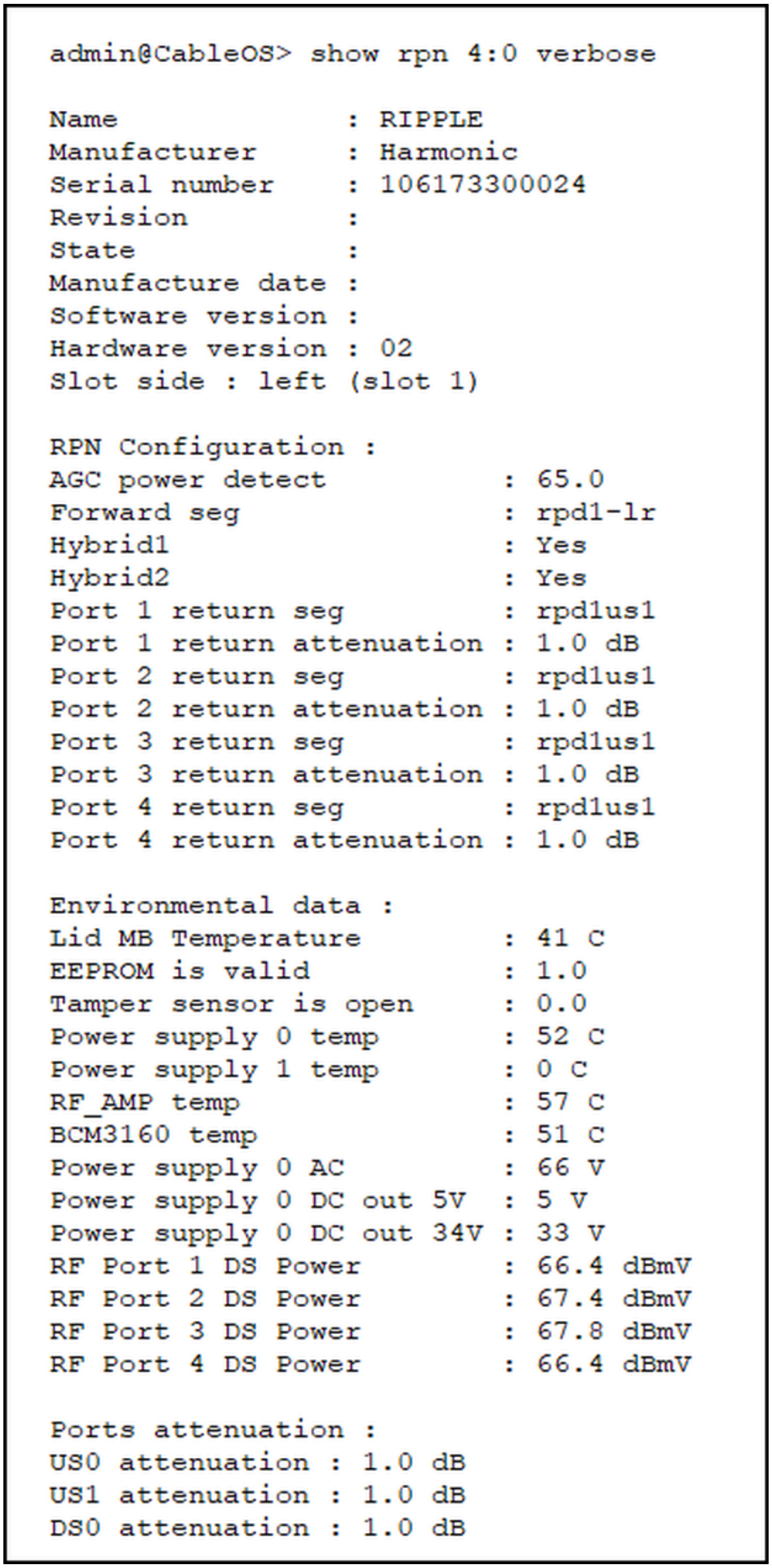
Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example displays the aggregate of the lid and power measurements of a Ripple RPN at slot 4:0

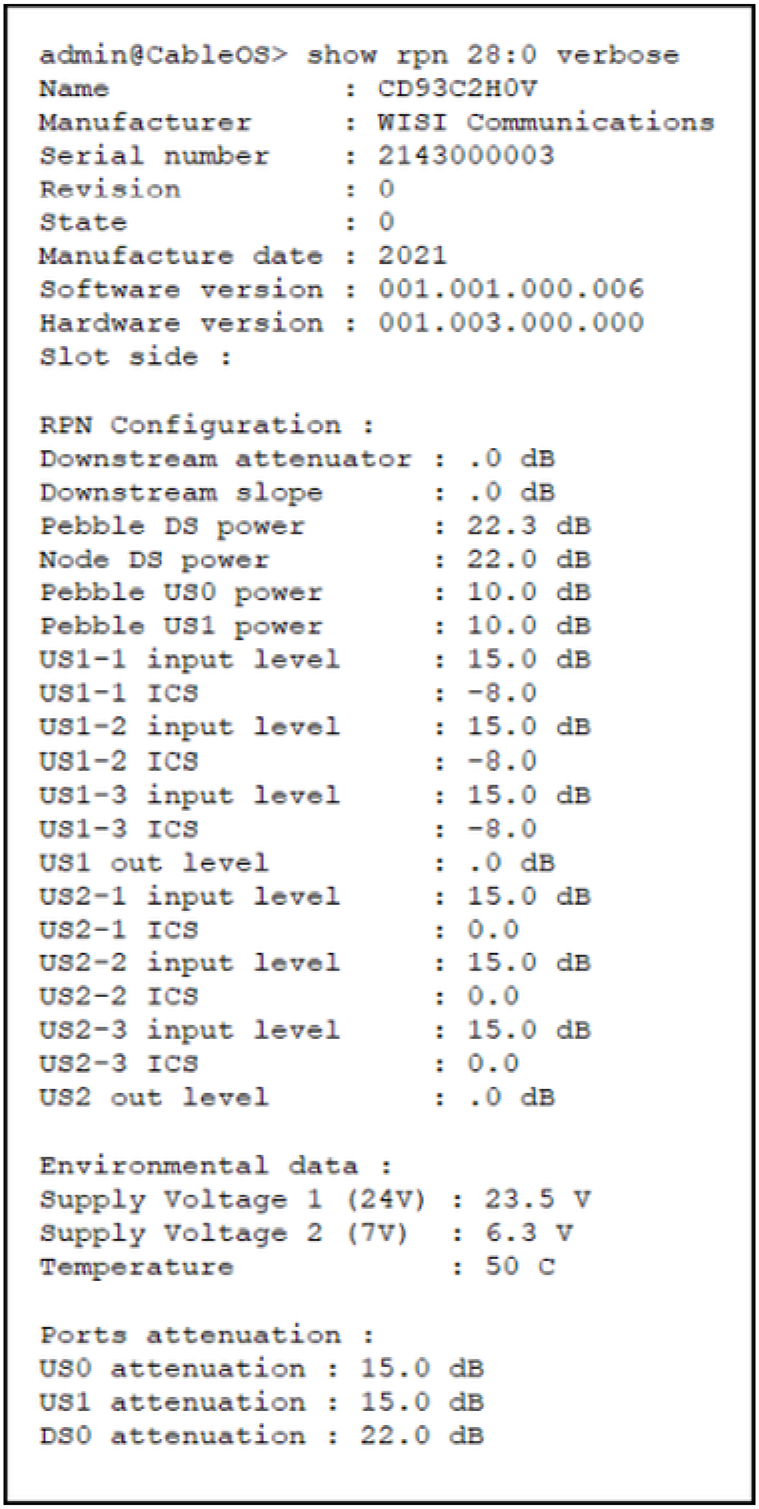
```
show rpn 4:0 verbose
```



```
admin@CableOS> show rpn 4:0 verbose

Name                 : RIPPLE
Manufacturer         : Harmonic
Serial number        : 106173300024
Revision             :
State                :
Manufacture date :
Software version :
Hardware version : 02
Slot side : left (slot 1)

RPN Configuration :
AGC power detect             : 65.0
Forward seg                  : rpd1-lr
Hybrid1                      : Yes
Hybrid2                      : Yes
Port 1 return seg            : rpd1us1
Port 1 return attenuation : 1.0 dB
Port 2 return seg            : rpd1us1
Port 2 return attenuation : 1.0 dB
Port 3 return seg            : rpd1us1
Port 3 return attenuation : 1.0 dB
Port 4 return seg            : rpd1us1
Port 4 return attenuation : 1.0 dB

Environmental data :
Lid MB Temperature           : 41 C
EEPROM is valid              : 1.0
Tamper sensor is open        : 0.0
Power supply 0 temp          : 52 C
Power supply 1 temp          : 0 C
RF_AMP temp                  : 57 C
BCM3160 temp                 : 51 C
Power supply 0 AC            : 66 V
Power supply 0 DC out 5V     : 5 V
Power supply 0 DC out 34V : 33 V
RF Port 1 DS Power           : 66.4 dBmV
RF Port 2 DS Power           : 67.4 dBmV
RF Port 3 DS Power           : 67.8 dBmV
RF Port 4 DS Power           : 66.4 dBmV

Ports attenuation :
US0 attenuation : 1.0 dB
US1 attenuation : 1.0 dB
DS0 attenuation : 1.0 dB
```

The following example displays the aggregate of the lid and power measurements of a WISI CD93 Slim RPN at slot 28:0

```
show rpn 28:0 verbose
```



```
admin@CableOS> show rpn 28:0 verbose
Name              : CD93C2H0V
Manufacturer      : WISI Communications
Serial number     : 2143000003
Revision          : 0
State             : 0
Manufacture date : 2021
Software version : 001.001.000.006
Hardware version : 001.003.000.000
Slot side :

RPN Configuration :
Downstream attenuator : .0 dB
Downstream slope      : .0 dB
Pebble DS power       : 22.3 dB
Node DS power         : 22.0 dB
Pebble US0 power      : 10.0 dB
Pebble US1 power      : 10.0 dB
US1-1 input level     : 15.0 dB
US1-1 ICS             : -8.0
US1-2 input level     : 15.0 dB
US1-2 ICS             : -8.0
US1-3 input level     : 15.0 dB
US1-3 ICS             : -8.0
US1 out level         : .0 dB
US2-1 input level     : 15.0 dB
US2-1 ICS             : 0.0
US2-2 input level     : 15.0 dB
US2-2 ICS             : 0.0
US2-3 input level     : 15.0 dB
US2-3 ICS             : 0.0
US2 out level         : .0 dB

Environmental data :
Supply Voltage 1 (24V) : 23.5 V
Supply Voltage 2 (7V)  : 6.3 V
Temperature            : 50 C

Ports attenuation :
US0 attenuation : 15.0 dB
US1 attenuation : 15.0 dB
DS0 attenuation : 22.0 dB
```

Related information

show rpn config

show rpn environment

show running-config

Use the `show running-config` command to show the currently running CableOS Core configuration.

```
show running-config
```

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

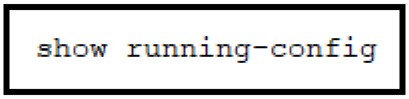
Usage guidelines

The CableOS Cloud-Native configuration has only a running-config.

The CableOS Cloud-Native configuration consists of:

- A local-node (node-specific) configuration
- A platform (cluster-wide) configuration

Example



```
show running-config
```

Related information

copy running-config startup-config

show startup-config

show running-config cable privacy hotlist

Use the `show running-config cable privacy hotlist` command to show the list of currently revoked CA certificates.

```
show running-config cable privacy hotlist
```

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example will show the currently revoked CA certificates:

```
show running-config cable privacy hotlist
```

Related information

cable privacy hotlist

show running-config cable mtu-enhance

Use the `show running-config cable mtu-enhance` command to show the status of the MTU enhance capability.

`show running-config cable mtu-enhance`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example will show the status of the MTU enhance capability:

```
show running-config cable mtu-enhance
```

The system will return one of the following results:

```
cable mtu-enhance enabled
cable mtu-enhance disabled
```

Related information

cable mtu-enhance

show snmp

Use the `show snmp` command to check the status of Simple Network Management Protocol (SNMP) communications.

`show snmp`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

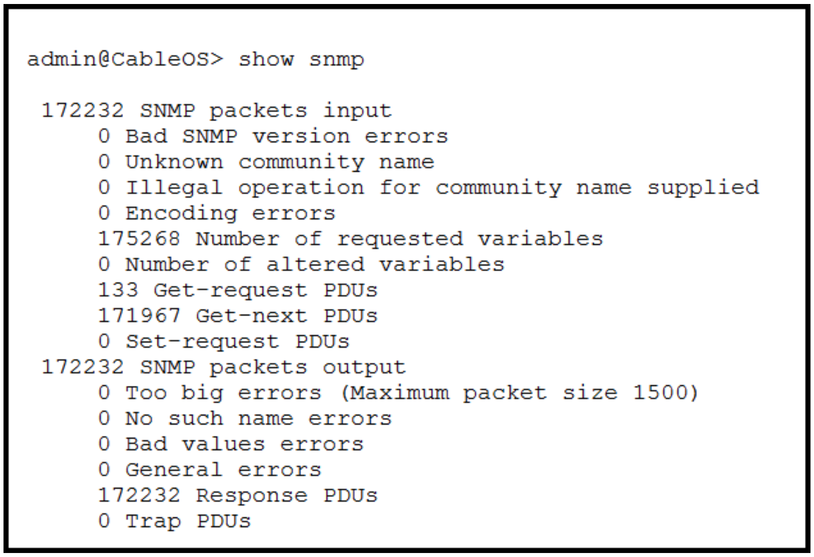
Usage guidelines

This command provides counter information for SNMP operations.

Examples

The following example shows SNMP packets input (with details) and SNMP packets output (with details):

```
show snmp
```



```
admin@CableOS> show snmp

 172232 SNMP packets input
     0 Bad SNMP version errors
     0 Unknown community name
     0 Illegal operation for community name supplied
     0 Encoding errors
     175268 Number of requested variables
     0 Number of altered variables
     133 Get-request PDUs
     171967 Get-next PDUs
     0 Set-request PDUs
 172232 SNMP packets output
     0 Too big errors (Maximum packet size 1500)
     0 No such name errors
     0 Bad values errors
     0 General errors
     172232 Response PDUs
     0 Trap PDUs
```

Related information

show version cable rpd

show startup-config

Use the `show startup-config` command to show the startup configuration of the CableOS Core after a reboot.

```
show startup-config
```

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage Guidelines

The command can be used to see a full description of available NICs on the current device and their HA components (if any).

Examples

The following example will display the startup configuration:

```
show startup-config
```

Related information

copy running-config startup-config

show running-config

show startup-config archive

Use the `show startup-config archive` to show the history of startup config changes.

`show startup-config archive`

Syntax description

This command has no arguments or keywords.

Default

This command has no default value.

Command mode

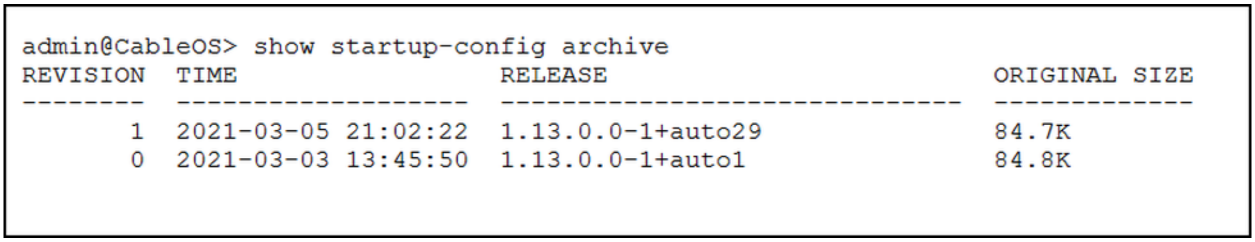
Exec mode

Usage guidelines

Each time a configuration is written to the startup-config, it is also compressed and stored. Any stored revision of the startup-config can be restored by the `restore startup-config` command.

Examples

The example below shows a sample output of the command:



```
admin@CableOS> show startup-config archive
REVISION  TIME                 RELEASE                         ORIGINAL SIZE
--------  -------------------  ------------------------------  -------------
       1  2021-03-05 21:02:22  1.13.0.0-1+auto29               84.7K
       0  2021-03-03 13:45:50  1.13.0.0-1+auto1                84.8K
```

Related information

restore startup-config

show system ipsec tunnel state

Use the `show system ipsec tunnel state` command to show the status of IPSEC tunnels.

```
show system ipsec tunnel state
```

Syntax description

This command has no arguments or keywords.

Default

This command has no default value.

Command mode

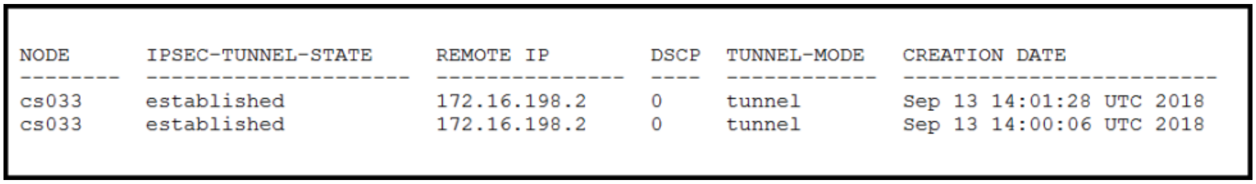
Exec mode.

Usage guidelines

For more information on how to configure LI IPSEC tunnels, see the CableOS User Guide.

Example

The example below shows two enabled tunnels:



```
NODE      IPSEC-TUNNEL-STATE     REMOTE IP        DSCP  TUNNEL-MODE   CREATION DATE
--------  ---------------------  ---------------  ----  ------------  -------------------------
cs033     established            172.16.198.2     0     tunnel        Sep 13 14:01:28 UTC 2018
cs033     established            172.16.198.2     0     tunnel        Sep 13 14:00:06 UTC 2018
```

Related information

system ipsec tunnel

show system proto-throttle

Use the `show system-proto-throttle` command to show the protocol throttling configuration and the sent/filtered counters.

```
show system proto-throttle
```

Syntax description

This command has no arguments or keywords.

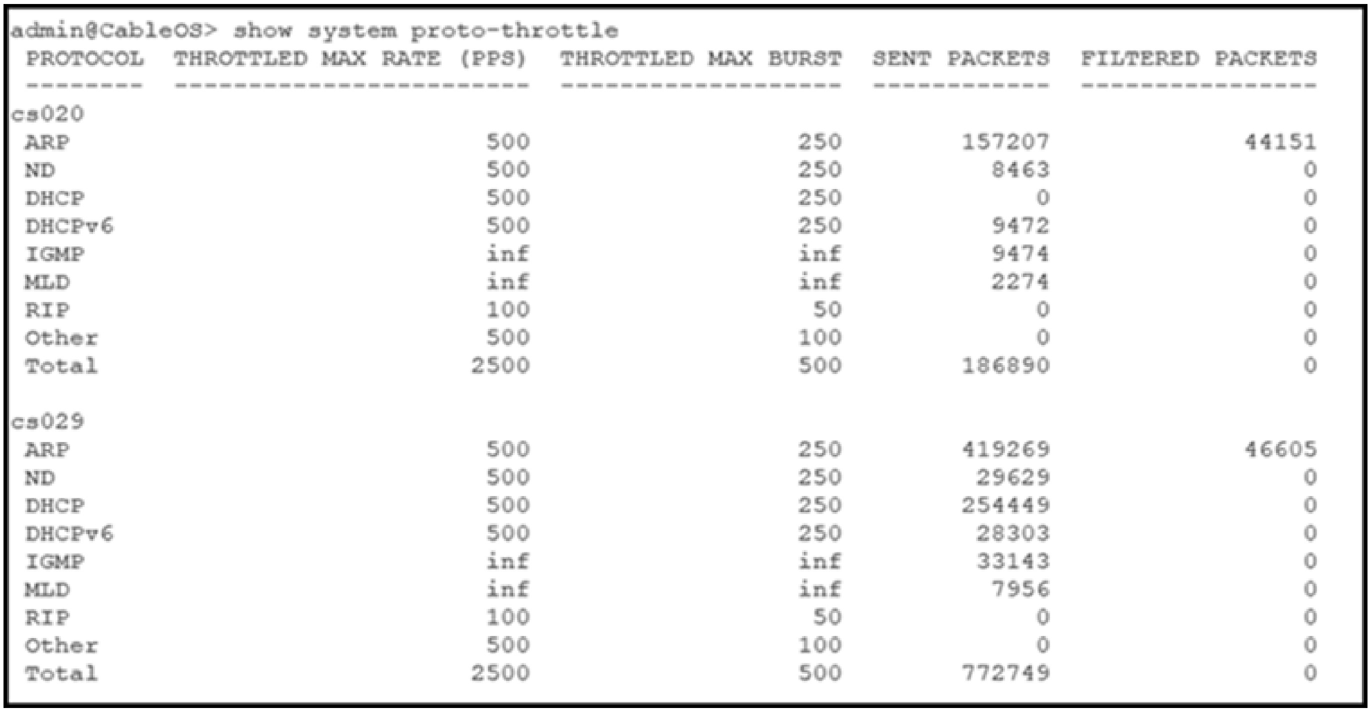
Command mode

Exec mode.

Usage guidelines

Total packets filtered is not an aggregation of all packets that were filtered, but the packets filtered in the Total rate-limiter after being passed by the specific protocol rate-limiter.

Example



```
admin@CableOS> show system proto-throttle
 PROTOCOL  THROTTLED MAX RATE (PPS)  THROTTLED MAX BURST  SENT PACKETS  FILTERED PACKETS
 --------  ------------------------  -------------------  ------------  ----------------
cs020
 ARP                            500                  250        157207             44151
 ND                             500                  250          8463                 0
 DHCP                           500                  250             0                 0
 DHCPv6                         500                  250          9472                 0
 IGMP                           inf                  inf          9474                 0
 MLD                            inf                  inf          2274                 0
 RIP                            100                   50             0                 0
 Other                          500                  100             0                 0
 Total                         2500                  500        186890                 0

cs029
 ARP                            500                  250        419269             46605
 ND                             500                  250         29629                 0
 DHCP                           500                  250        254449                 0
 DHCPv6                         500                  250         28303                 0
 IGMP                           inf                  inf         33143                 0
 MLD                            inf                  inf          7956                 0
 RIP                            100                   50             0                 0
 Other                          500                  100             0                 0
 Total                         2500                  500        772749                 0
```

Related information

clear system proto-throttle

system proto-throttle

show system scep

Use the `show system scep` command to display the state of the SCEP client, the CA certificates state, acquired certificates, and the state of IPSEC tunnels.

```
show system scep
```

Syntax description

This command has no arguments or keywords.

Default

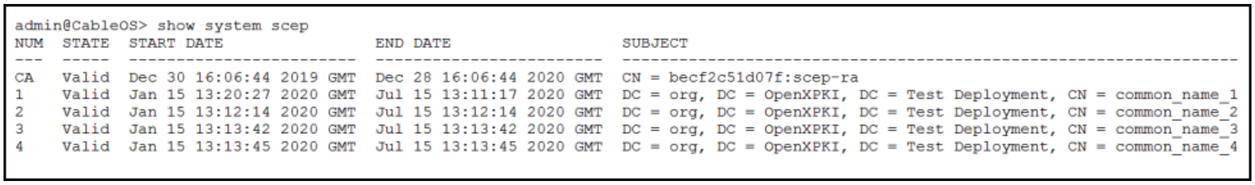
This command has no default value.

Command mode

Exec Mode

Examples

The example below shows the output from a `show system scep` command



```
admin@CableOS> show system scep
NUM  STATE  START DATE                END DATE                  SUBJECT
---  -----  ------------------------  ------------------------  -----------------------------------------------------------------
CA   Valid  Dec 30 16:06:44 2019 GMT  Dec 28 16:06:44 2020 GMT  CN = becf2c51d07f:scep-ra
1    Valid  Jan 15 13:20:27 2020 GMT  Jul 15 13:11:17 2020 GMT  DC = org, DC = OpenXPKI, DC = Test Deployment, CN = common_name_1
2    Valid  Jan 15 13:12:14 2020 GMT  Jul 15 13:12:14 2020 GMT  DC = org, DC = OpenXPKI, DC = Test Deployment, CN = common_name_2
3    Valid  Jan 15 13:13:42 2020 GMT  Jul 15 13:13:42 2020 GMT  DC = org, DC = OpenXPKI, DC = Test Deployment, CN = common_name_3
4    Valid  Jan 15 13:13:45 2020 GMT  Jul 15 13:13:45 2020 GMT  DC = org, DC = OpenXPKI, DC = Test Deployment, CN = common_name_4
```

Output columns

Field	**Description**
NUM	The number of the certificate
STATE	The state of the certificate. the possible states are: • Valid - the certificate is acquired and is valid • Failed - the SCEP operation failed and certificate is in a failed state • Renewal - the certificate is currently being renewed • Enrollment - the certificate is currently being enrolled • Unknown - the certificate is in an unknown state, no operation was running before
START DATE	The date when the certicate became valid
END DATR	The date when the certificate will expire
SUBJECT	The subject of the certificate. When the certificate is in **Failed** state, it shows an error text

Related information

system scep

scep enrollment

scep renewal

snmp-server enable traps core scep-event

show tech-support

Use the `show tech-support` command to collect debug information for quick investigation of issues in a system and pack it into archive files.

Usage guidelines

We collect the following debug information sources [CBLOS-5185, CBLOS-28565]:

- CLI running config and startup config
- log files (for example, Mulpi, Depi, USPP, PTP, Scheduler, Rabbitmq, Redis)
- all system journals (including journals from previous boots)

- ulc-debug command output (for example, ulc-debug mulpi ShowLccesTopology, ShowCmAll, ShowCmAllChan, ShowDsTopology, ShowDsFlowTopology, ShowUsTopology, ShowUsFlowTopology, ShowFlapList, ShowDepiSessions, ShowMdInfo, GetMdToSchedMapping, ulc-debug uspp ShowPerSchedStats)
- CLI command output (for example, show version, scr, scm, show cluster status, show inventory)
- postgresql dump
- cluster status
- core dumps
- processes list
- disk space
- system uptime
- gluster status
- network status

All dumps are available in the /srv/cableos/tech-support folder, for example, /srv/cableos/tech-support/tech-support__cs017__2019-03-29_16-30-35.tar.gz.

The command takes about 10 minutes to run on a scale setup.

Example

```
admin@CableOS> show tech-support
INFO:  Starting diagnostics on cs024

INFO:  Active nodes: ['cs017', 'cs024']
INFO:  Master: cs024
INFO:  Slaves: ['cs017']

INFO:  Creating tmp dir at /srv/cableos/tech-support/cs024
INFO:  Checking cs017 in parallel
INFO:  confd is running on pids ['12941', '18837', '37295', '40153']
INFO:  Dumping running-config
INFO:  Dumping startup-config
INFO:  Checking core version
INFO:  Checking rpd version
INFO:  Checking modems
INFO:  Checking CPEs
INFO:  Checking core ptp
INFO:  Checking modems phy
INFO:  Checking environment info
INFO:  Checking voltage
INFO:  Checking inventory
INFO:  Checking cluster-nic version
INFO:  Checking cluster status
INFO:  Checking cluster history
INFO:  System uptime is:  16:30:08 up 11 min,  4 users,  load average: 37.63, 29.65,
 15.97

INFO:  Done
```

```
INFO:  confd is running on pids ['12941', '18837', '37295', '40153']
INFO:  Checking rpd version
INFO:  Checking rpd description
INFO:  Checking rpd identify-failed
INFO:  Checking rpd mtu
INFO:  Checking rpd port-transceiver
```

```
INFO:  Checking rpd 1:0 capabilities
INFO:  Checking rpd 1:0 verbose
INFO:  Checking rpd 1:0 environment temperature
INFO:  Checking rpd 1:0 environment voltage
INFO:  Checking rpd 1:0 gcp-log
INFO:  Checking rpd 1:0 gcp-log summary
INFO:  Checking rpd 1:0 gcp-log verbose
INFO:  Checking rpd 1:0 ptp time-property
INFO:  Checking rpd 1:0 session
INFO:  Checking rpd 1:0 video-channel
INFO:  Checking rpd 2:0 capabilities
INFO:  Checking rpd 2:0 verbose
INFO:  Checking rpd 2:0 environment temperature
INFO:  Checking rpd 2:0 environment voltage
INFO:  Checking rpd 2:0 gcp-log
INFO:  Checking rpd 2:0 gcp-log summary
INFO:  Checking rpd 2:0 gcp-log verbose
INFO:  Checking rpd 2:0 ptp time-property
INFO:  Checking rpd 2:0 session
INFO:  Checking rpd 2:0 video-channel
INFO:  Checking rpd 3:0 capabilities
INFO:  Checking rpd 3:0 verbose
INFO:  Checking rpd 3:0 environment temperature
INFO:  Checking rpd 3:0 environment voltage
INFO:  Checking rpd 3:0 gcp-log
INFO:  Checking rpd 3:0 gcp-log summary
INFO:  Checking rpd 3:0 gcp-log verbose
INFO:  Checking rpd 3:0 ptp time-property
INFO:  Checking rpd 3:0 session
INFO:  Checking rpd 3:0 video-channel
INFO:  Rpd 21:0 is not online
INFO:  Rpd 22:0 is not online
INFO:  Rpd 23:0 is not online
INFO:  Done
```

```
INFO:  confd is running on pids ['12941', '18837', '37295', '40153']
INFO:  Checking modem bonding downstream
INFO:  Checking modem bonding upstream
INFO:  Checking modem calls
INFO:  Checking modem cm-status
INFO:  Checking modem connectivity
INFO:  Checking modem counters
INFO:  Checking modem cpe
INFO:  Checking modem cpe dhcp
INFO:  Checking modem cpe ipv6
INFO:  Checking modem dhcp
INFO:  Checking modem ipv6
INFO:  Checking modem docsis device-class
INFO:  Checking modem docsis version
INFO:  Checking modem lcce
INFO:  Checking modem lcce
INFO:  Checking modem leasequery-filter
INFO:  Checking modem load-balance group
INFO:  Checking modem load-balance group restricted
INFO:  Checking modem mtu
INFO:  Checking offline modems
INFO:  Checking partial-mode modems
INFO:  Checking modem phy
INFO:  Checking modem primary channel
INFO:  Checking registered modems
INFO:  Checking ripv2 modems
INFO:  Checking rogue modems
```

```
INFO:  Checking failed-bonding modems
INFO:  Checking non-bonding-capable modems
INFO:  Checking modems summary
INFO:  Checking modem ugs
INFO:  Checking unregistered modems
INFO:  Checking modem uptime
INFO:  Checking modem vendor
INFO:  Checking modem vendor OUI
INFO:  Done

INFO:  confd is running on pids ['12941', '18837', '37295', '40153']
INFO:  Checking rpd 1:0 counters downstream
INFO:  Checking rpd 1:0 counters map
INFO:  Checking rpd 1:0 counters upstream
INFO:  Checking rpd 1:0 video-channel counters
INFO:  Checking rpd 2:0 counters downstream
INFO:  Checking rpd 2:0 counters map
INFO:  Checking rpd 2:0 counters upstream
INFO:  Checking rpd 2:0 video-channel counters
INFO:  Checking rpd 3:0 counters downstream
INFO:  Checking rpd 3:0 counters map
INFO:  Checking rpd 3:0 counters upstream
INFO:  Checking rpd 3:0 video-channel counters
INFO:  Rpd 21:0 is not online
INFO:  Rpd 22:0 is not online
INFO:  Rpd 23:0 is not online
INFO:  Done

INFO:  Dumping active processes list
INFO:  Done

INFO:  Checking memory usage
INFO:  Done

INFO:  Checking ifconfig

INFO:  Checking routes

INFO:  Checking netstat

INFO:  Dumping ip address list

INFO:  Dumping ip neigh list

INFO:  Checking disk space
INFO:  Done

INFO:  Dumping open files and sockets list
INFO:  Done

INFO:  Dumping package list
INFO:  Done

INFO:  Checking mulpi
INFO:  ulcmulpid is running on pids ['14758', '23877']
INFO:  Dumping ulc-debug lcces topology
INFO:  Dumping ulc-debug cm's
INFO:  Dumping ulc-debug cm's channels
INFO:  Dumping ulc-debug ds topology
INFO:  Dumping ulc-debug us topology
INFO:  Dumping ulc-debug ds flow topology
INFO:  Dumping ulc-debug us flow topology
INFO:  Dumping ulc-debug flap list
INFO:  Dumping ulc-debug depi sessions
INFO:  Dumping ulc-debug ShowLease
```

```
INFO:  Dumping ulc-debug ShowMdInfo
INFO:  Dumping ulc-debug GetMdToSchedMapping
INFO:  Dumping ulc-debug ShowSavTable
INFO:  Dumping ulc-debug sf id maps
INFO:  Dumping ulc-debug depi connections tab
INFO:  Dumping ulc-debug uspp show link
INFO:  Dumping ulc-debug uspp show stats
INFO:  Dumping ulc-debug uspp show per scheduler stats
INFO:  Done

INFO:  Dumping IPMI events
INFO:  Done

INFO:  Dumping journalctl
INFO:  Done

INFO:  Checking rabbitmq
INFO:  rabbitmq is running on pids ['8315']
INFO:  Checking rabbitmq status
INFO:  Checking rabbitmq cluster status
INFO:  Dumping rabbitmq queues
INFO:  Dumping rabbitmq exchanges
INFO:  Dumping rabbitmq bindings
INFO:  Dumping rabbitmq connections
INFO:  Dumping rabbitmq channels
INFO:  Dumping rabbitmq consumers

INFO:  Done

INFO:  Checking redis
INFO:  redis-server is running on pids ['7770', '22310', '22316', '22320']
INFO:  Dumping redis keys
INFO:  Done

INFO:  Copying logs
INFO:  Done

INFO:  Copying pengine data
INFO:  Done

INFO:  Checking postgresql
INFO:  postgres is running on pids ['13608', '13650', '13651', '13652', '13653',
 '13654', '13974', '13984', '14      015', '14078', '14145', '14371', '14565',
 '15214', '16741', '17180', '24008', '24009', '24010', '24011', '24012      ',
 '24013', '24014', '24015', '24016', '24017', '24018', '24019', '24020', '24021',
 '24022', '24024', '24025',        '24026', '24027', '24028', '24029', '24030',
 '24031', '24033', '24813', '25273', '25638', '25667', '25988', '26      550',
 '29180', '29189', '29221', '29372', '30779', '30790', '30801', '30864', '30873',
 '30888', '30893', '30894      ', '31079', '36257', '36488', '37067', '37115',
 '37467', '42886']
INFO:  Dumping database (this may take a while)
INFO:  Done

INFO:  Dumping cluster status
INFO:  Dumping gluster status
INFO:  Done

INFO:  Copying coredumps
INFO:  No coredumps found
INFO:  confd is running on pids ['12941', '18837', '37295', '40153']
INFO:  Checking rpd 1:0 counters downstream
INFO:  Checking rpd 1:0 counters map
INFO:  Checking rpd 1:0 counters upstream
INFO:  Checking rpd 1:0 video-channel counters
INFO:  Checking rpd 2:0 counters downstream
```

```
INFO:  Checking rpd 2:0 counters map
INFO:  Checking rpd 2:0 counters upstream
INFO:  Checking rpd 2:0 video-channel counters
INFO:  Checking rpd 3:0 counters downstream
INFO:  Checking rpd 3:0 counters map
INFO:  Checking rpd 3:0 counters upstream
INFO:  Checking rpd 3:0 video-channel counters
INFO:  Rpd 21:0 is not online
INFO:  Rpd 22:0 is not online
INFO:  Rpd 23:0 is not online
INFO:  Done

INFO:  Checking mulpi
INFO:  ulcmulpid is running on pids ['14758', '23877']
INFO:  Dumping ulc-debug lcces topology
INFO:  Dumping ulc-debug cm's
INFO:  Dumping ulc-debug cm's channels
INFO:  Dumping ulc-debug ds topology
INFO:  Dumping ulc-debug us topology
INFO:  Dumping ulc-debug ds flow topology
INFO:  Dumping ulc-debug us flow topology
INFO:  Dumping ulc-debug flap list
INFO:  Dumping ulc-debug depi sessions
INFO:  Dumping ulc-debug ShowLease
INFO:  Dumping ulc-debug ShowMdInfo
INFO:  Dumping ulc-debug GetMdToSchedMapping
INFO:  Dumping ulc-debug ShowSavTable
INFO:  Dumping ulc-debug sf id maps
INFO:  Dumping ulc-debug depi connections tab
INFO:  Dumping ulc-debug uspp show link
INFO:  Dumping ulc-debug uspp show stats
INFO:  Dumping ulc-debug uspp show per scheduler stats
INFO:  Done

INFO:  Compressing results (this may take a while)
INFO:  All dumps are available at /srv/cableos/tech-support/tech-
support__cs024__2019-03-29_16-38-29.tar.gz

INFO:  System uptime is:  16:39:21 up 20 min,  4 users,  load average: 38.68, 37.19,
 26.04

INFO:  Waiting while all jobs are done...

----------------------------------------------------------------
INFO:  Starting diagnostics on cs017

INFO:  Creating tmp dir at /srv/cableos/tech-support/cs017
INFO:  Dumping active processes list
INFO:  Done

INFO:  Checking memory usage
INFO:  Done

INFO:  Checking ifconfig

INFO:  Checking routes

INFO:  Checking netstat

INFO:  Dumping ip address list

INFO:  Dumping ip neigh list

INFO:  Checking disk space
INFO:  Done
```

```
INFO:  Dumping open files and sockets list
INFO:  Done

INFO:  Dumping package list
INFO:  Done

INFO:  Checking mulpi
INFO:  ulcmulpid is running on pids ['11584']
INFO:  Dumping ulc-debug lcces topology
INFO:  Dumping ulc-debug cm's
INFO:  Dumping ulc-debug cm's channels
INFO:  Dumping ulc-debug ds topology
INFO:  Dumping ulc-debug us topology
INFO:  Dumping ulc-debug ds flow topology
INFO:  Dumping ulc-debug us flow topology
INFO:  Dumping ulc-debug flap list
INFO:  Dumping ulc-debug depi sessions
INFO:  Dumping ulc-debug ShowLease
INFO:  Dumping ulc-debug ShowMdInfo
INFO:  Dumping ulc-debug GetMdToSchedMapping
INFO:  Dumping ulc-debug ShowSavTable
INFO:  Dumping ulc-debug sf id maps
INFO:  Dumping ulc-debug depi connections tab
INFO:  Dumping ulc-debug uspp show link
INFO:  Dumping ulc-debug uspp show stats
INFO:  Dumping ulc-debug uspp show per scheduler stats
INFO:  Done

INFO:  Dumping IPMI events
INFO:  Done

INFO:  Dumping journalctl
INFO:  Done

INFO:  Checking rabbitmq
INFO:  rabbitmq is running on pids ['4596']
INFO:  Checking rabbitmq status
INFO:  Checking rabbitmq cluster status
INFO:  Dumping rabbitmq queues
INFO:  Dumping rabbitmq exchanges
INFO:  Dumping rabbitmq bindings
INFO:  Dumping rabbitmq connections
INFO:  Dumping rabbitmq channels
INFO:  Dumping rabbitmq consumers

INFO:  Done

INFO:  Checking redis
INFO:  redis-server is running on pids ['9068', '16690', '16694', '16698']
INFO:  Dumping redis keys
INFO:  Done

INFO:  Copying logs
INFO:  Done

INFO:  Copying pengine data
INFO:  Done

INFO:  Dumping cluster status
INFO:  Dumping gluster status
INFO:  Done

INFO:  Copying coredumps
INFO:  No coredumps found
```

```
INFO:  Checking mulpi
INFO:  ulcmulpid is running on pids ['11584']
INFO:  Dumping ulc-debug lcces topology
INFO:  Dumping ulc-debug cm's
INFO:  Dumping ulc-debug cm's channels
INFO:  Dumping ulc-debug ds topology
INFO:  Dumping ulc-debug us topology
INFO:  Dumping ulc-debug ds flow topology
INFO:  Dumping ulc-debug us flow topology
INFO:  Dumping ulc-debug flap list
INFO:  Dumping ulc-debug depi sessions
INFO:  Dumping ulc-debug ShowLease
INFO:  Dumping ulc-debug ShowMdInfo
INFO:  Dumping ulc-debug GetMdToSchedMapping
INFO:  Dumping ulc-debug ShowSavTable
INFO:  Dumping ulc-debug sf id maps
INFO:  Dumping ulc-debug depi connections tab
INFO:  Dumping ulc-debug uspp show link
INFO:  Dumping ulc-debug uspp show stats
INFO:  Dumping ulc-debug uspp show per scheduler stats
INFO:  Done

INFO:  Compressing results (this may take a while)
INFO:  All dumps are available at /srv/cableos/tech-support/tech-
support__cs017__2019-03-29_16-30-35.tar.gz

INFO:  System uptime is:  16:31:13 up 11 min,  5 users,  load average: 28.43, 24.94,
 13.92

INFO:  Copying /srv/cableos/tech-support/tech-
support__cs017__2019-03-29_16-30-35.tar to cs024
```

show upgrade process

Use the `show upgrade process` command to display the status of an installation process.

`show upgrade process`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

This command shows if there is an installation process in progress and the status of that process. The possible status options are:

- running
- inactive
- failed

Example

The following example will display if there is an installation process currently in process:

```
show upgrade process
```

Related information

install
reboot passive all
show images
show version

show utilization ds

Use the `show utilization ds` command to show the utilization of each downstream channel by the CableOS Core.

`show utilization ds`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

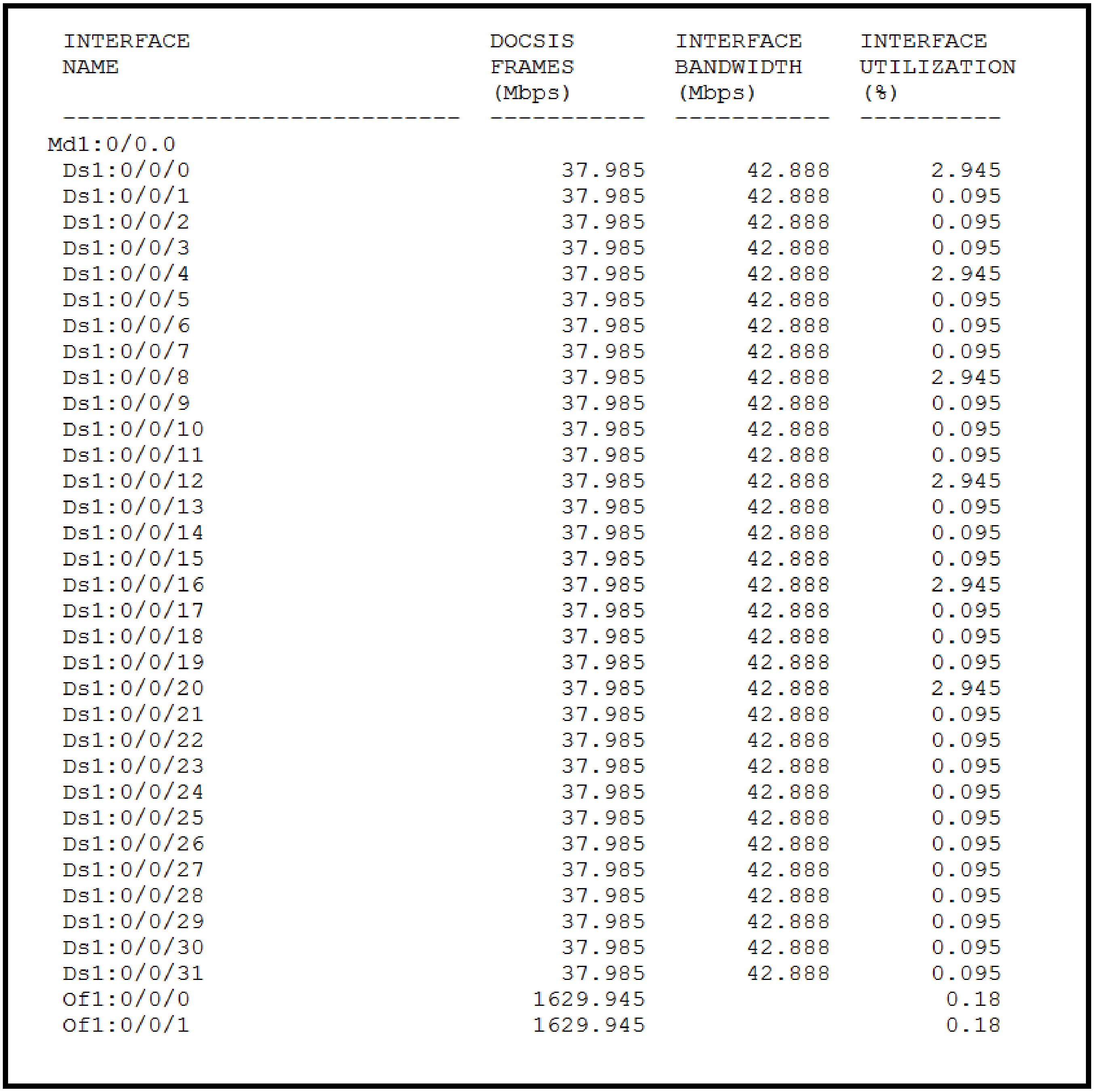
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ---------------------------------------------------------------------------
 x
```

Example

The following example displays the utilization of each downstream channel:

```
show utilization ds
```



```
 INTERFACE                           DOCSIS       INTERFACE    INTERFACE
 NAME                                FRAMES       BANDWIDTH    UTILIZATION
                                     (Mbps)       (Mbps)       (%)
 ----------------------------        -----------  -----------  ----------
Md1:0/0.0
 Ds1:0/0/0                               37.985       42.888       2.945
 Ds1:0/0/1                               37.985       42.888       0.095
 Ds1:0/0/2                               37.985       42.888       0.095
 Ds1:0/0/3                               37.985       42.888       0.095
 Ds1:0/0/4                               37.985       42.888       2.945
 Ds1:0/0/5                               37.985       42.888       0.095
 Ds1:0/0/6                               37.985       42.888       0.095
 Ds1:0/0/7                               37.985       42.888       0.095
 Ds1:0/0/8                               37.985       42.888       2.945
 Ds1:0/0/9                               37.985       42.888       0.095
 Ds1:0/0/10                              37.985       42.888       0.095
 Ds1:0/0/11                              37.985       42.888       0.095
 Ds1:0/0/12                              37.985       42.888       2.945
 Ds1:0/0/13                              37.985       42.888       0.095
 Ds1:0/0/14                              37.985       42.888       0.095
 Ds1:0/0/15                              37.985       42.888       0.095
 Ds1:0/0/16                              37.985       42.888       2.945
 Ds1:0/0/17                              37.985       42.888       0.095
 Ds1:0/0/18                              37.985       42.888       0.095
 Ds1:0/0/19                              37.985       42.888       0.095
 Ds1:0/0/20                              37.985       42.888       2.945
 Ds1:0/0/21                              37.985       42.888       0.095
 Ds1:0/0/22                              37.985       42.888       0.095
 Ds1:0/0/23                              37.985       42.888       0.095
 Ds1:0/0/24                              37.985       42.888       0.095
 Ds1:0/0/25                              37.985       42.888       0.095
 Ds1:0/0/26                              37.985       42.888       0.095
 Ds1:0/0/27                              37.985       42.888       0.095
 Ds1:0/0/28                              37.985       42.888       0.095
 Ds1:0/0/29                              37.985       42.888       0.095
 Ds1:0/0/30                              37.985       42.888       0.095
 Ds1:0/0/31                              37.985       42.888       0.095
 Of1:0/0/0                             1629.945                     0.18
 Of1:0/0/1                             1629.945                     0.18
```

Output columns

Field	Description
Interface Name	Shows the names of the downstream interfaces, grouped by MAC domain
DOCSIS Frames (Mbps)	Shows the bandwidth of the channel in bytes without the MPEG overhead, but with DOCSIS overhead. The value is shown with an accuracy of 3 decimal points.

Interface Bandwith (Mbps)	Shows the channel’s total physical bytes on wire (without overheads), and so its value is always greater than DOCSIS FRAMES. The value is shown with an accuracy of 3 decimal points. **NOTE:** For OFDM channels (starts with "Of" in the INTERFACE NAME column), this column will always be empty.
Interface Utilization (%)	Shows the percentage utilization of the interface. The value is shown with an accuracy of 3 decimal points.

Related information

show utilization us

show utilization us

Use the `show utilization us` command to show the utilization of each upstream channel by the CableOS Core.

`show utilization us`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

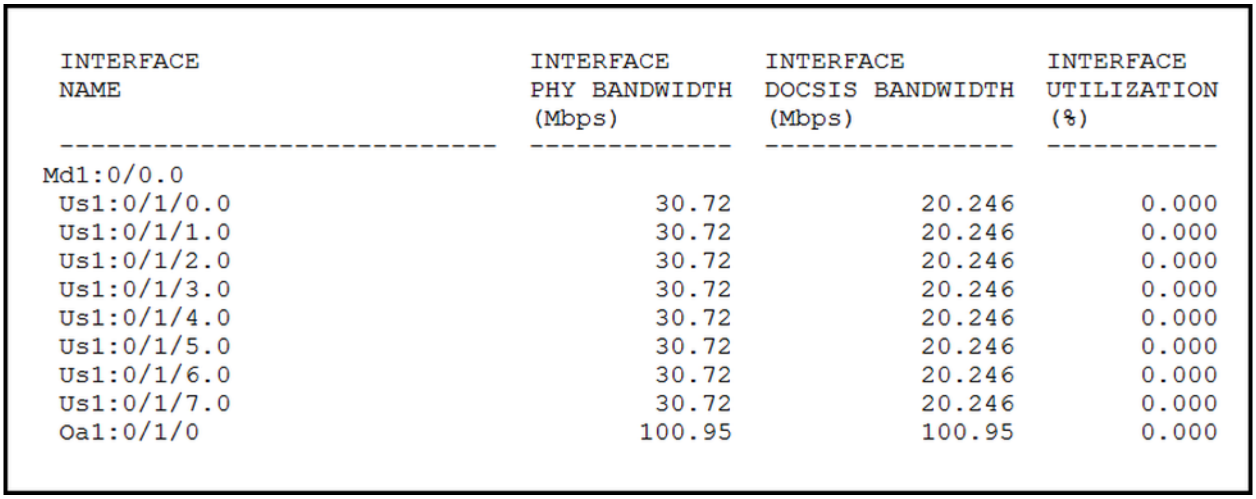
IMPORTANT: For CableOS Cloud-Native only, you may receive the following message in the period immediately after the system has come on-line:

```
x
 ---------------------------------------------------------------------------
 x
| Warning! The Core is currently updating all monitoring data and as a
 result |
| the data provided by this CLI command is outdated. Please try again
 later    |
x
 ---------------------------------------------------------------------------
 x
```

Example

The following example displays the utilization of each upstream channel:

```
show utilization us
```



```
  INTERFACE                                 INTERFACE       INTERFACE          INTERFACE
  NAME                                      PHY BANDWIDTH   DOCSIS BANDWIDTH   UTILIZATION
                                            (Mbps)          (Mbps)             (%)
  ----------------------------              -------------   ----------------   -----------
 Md1:0/0.0
  Us1:0/1/0.0                                       30.72             20.246         0.000
  Us1:0/1/1.0                                       30.72             20.246         0.000
  Us1:0/1/2.0                                       30.72             20.246         0.000
  Us1:0/1/3.0                                       30.72             20.246         0.000
  Us1:0/1/4.0                                       30.72             20.246         0.000
  Us1:0/1/5.0                                       30.72             20.246         0.000
  Us1:0/1/6.0                                       30.72             20.246         0.000
  Us1:0/1/7.0                                       30.72             20.246         0.000
  Oa1:0/1/0                                        100.95             100.95         0.000
```

Output columns

Field	Description
Interface Name	Shows the names of the upstream interfaces, grouped by MAC domain
Interface Phy Bandwith (Mbps)	Shows the channel capacity in Mbps The Channel capacity is derived from the following parameters: • Channel band width • IUCs ◦ Modulation QAM ◦ Pilot pattern • OFDMA exclusion
Interface DOCSIS Bandwidth	Shows the actual bandwidth for upstream traffic. This value is taken from the scheduler, and is dynamic, depending on current profile modulation.
Interface Utilization (%)	The channel is described by mini slots. The scheduler keeps status of how many mini slots were spent to data IUC5, 6, 9, 10, 11, 12 and 13, ranging, IUC1 per second. Utilization = used minislots / eligible minislots, where eligible minislots are: total-minislots - (IUC1 + IUC2 + IUC4 minislots)

NOTE: Currently the **Interface Phy Bandwith** and **Interface DOCSIS Bandwidth** values for OFDMA channels show the same value: the DOCSIS Phy value.

Related information

show utilization ds

show version

Use the `show version` command to show the hardware and software versions being used in the system.

`show version`

Syntax description

This command has no arguments or keywords.

Command mode

vcmts mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example will display the versions in the system:

```
show version
```

Related information

- install
- reboot passive all
- show images
- show upgrade process
- show images
- show version cluster-nic
- show version cluster-server
- show version cluster-server all
- install
- show upgrade process
- reboot passive all
- reboot passive hitless
- validate-iso-md5

show version cable rpd

Use the `show version cable rpd` command, using the syntax described in *CLI: Cable interface identifiers syntax*, to show the hardware and software versions of the cable RPD being used in the system.

`show version cable rpd` { *v-chassis:v-slot rpd-mac-address rpd-ip-address* }

Syntax description

v-chassis:v-slot	Selects the RPD configured with the "cable rpd v-chassis:v-slot".
rpd-mac-address	Selects the RPD using its MAC address, shown in the `show cable rpd` command.
rpd-ip-address	Selects the RPD using its IP address, shown in the `show cable rpd` command.

Command mode

Exec mode.

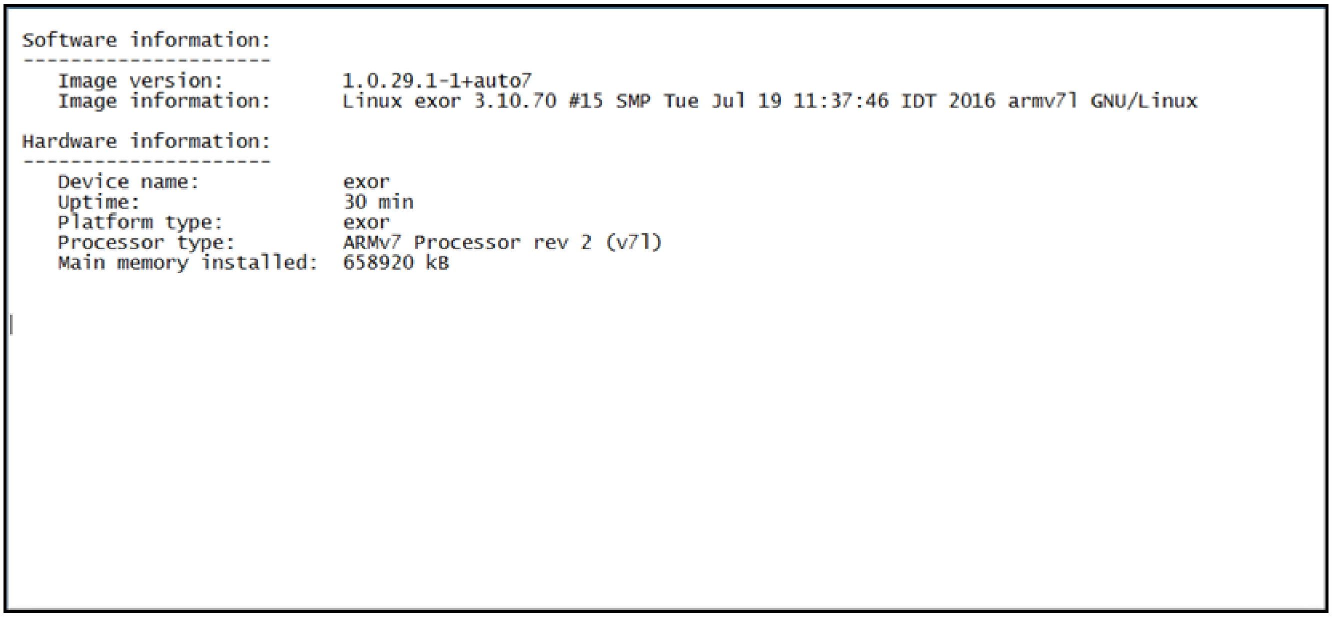
Usage Guidelines

Displays information regarding the software and hardware RPDs.

Example

The following example displays the versions in the system:

```
show version cable rpd 1:0
```



```
Software information:
---------------------
   Image version:        1.0.29.1-1+auto7
   Image information:    Linux exor 3.10.70 #15 SMP Tue Jul 19 11:37:46 IDT 2016 armv7l GNU/Linux

Hardware information:
---------------------
   Device name:          exor
   Uptime:               30 min
   Platform type:        exor
   Processor type:       ARMv7 Processor rev 2 (v7l)
   Main memory installed: 658920 kB
```

show version cluster-bios

Use the `show version cluster-bios` command to show the current BIOS version of an entire cluster.

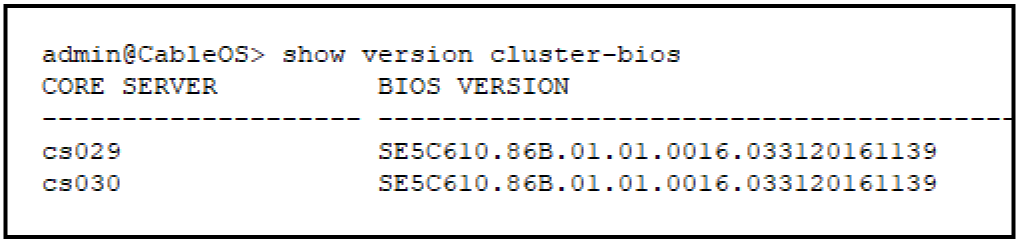
```
show version cluster-bios
```

Command mode

Exec mode.

Examples

Show the current BIOS version of an entire cluster.



```
admin@CableOS> show version cluster-bios
CORE SERVER          BIOS VERSION
-------------------- ----------------------------------------
cs029                SE5C610.86B.01.01.0016.033120161139
cs030                SE5C610.86B.01.01.0016.033120161139
```

show version cluster-nic

Use the `show version cluster-nic` command to show detailed information about installed NICs (Network Interface Controllers) on the device and their HA components (if any).

`show version cluster-nic`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

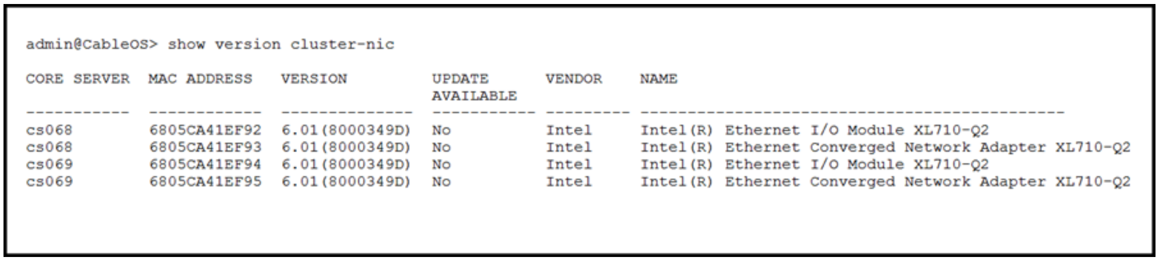
Usage Guidelines

The command can be used to see a full description of available NICs on the current device and their HA components (if any).

Example

The following example displays the NICs in the cluster:

```
show version cluster-nic
```



```
admin@CableOS> show version cluster-nic

CORE SERVER  MAC ADDRESS   VERSION         UPDATE      VENDOR    NAME
                                           AVAILABLE
-----------  ------------  --------------  ----------- --------- ---------------------------------------------
cs068        6805CA41EF92  6.01(8000349D)  No          Intel     Intel(R) Ethernet I/O Module XL710-Q2
cs068        6805CA41EF93  6.01(8000349D)  No          Intel     Intel(R) Ethernet Converged Network Adapter XL710-Q2
cs069        6805CA41EF94  6.01(8000349D)  No          Intel     Intel(R) Ethernet I/O Module XL710-Q2
cs069        6805CA41EF95  6.01(8000349D)  No          Intel     Intel(R) Ethernet Converged Network Adapter XL710-Q2
```

Related information

show images

show version
show version cluster-server
show version cluster-server all
install
show upgrade process
reboot passive all
reboot passive hitless
validate-iso-md5

show version cluster-server

Use the `show version cluster-server` command to show basic information about the software installed on the device and its HA component (if one exists).

`show version cluster-server`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage Guidelines

Displays information regarding the software and hardware RPDs.

Example

The following example will display the versions in the system:

```
show version cluster-server
```

Related information

show images
show version
show version cluster-nic
show version cluster-server all
install
show upgrade process
reboot passive all
reboot passive hitless
validate-iso-md5

show version cluster-server all

Use the `show version cluster-server all` command to show all information about the software installed on the device and its HA component (if one exists).

`show version cluster-server all`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

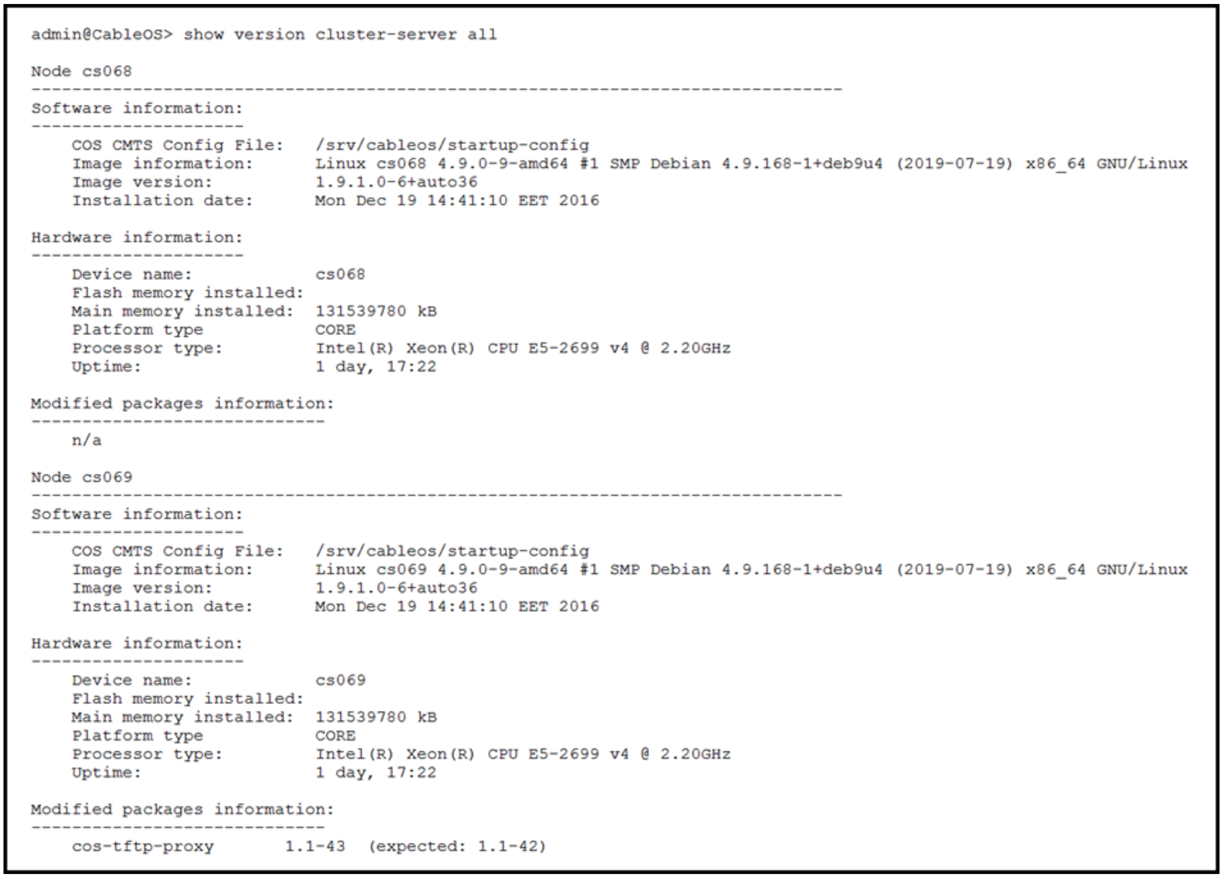
Usage Guidelines

The command can be used to see a full description of available software images, hardware images, and a list of packages that were modified since the last installation on the current device and its HA component (if one exists).

Example

The following example displays the versions in the cluster:

```
show version cluster-server all
```



```
admin@CableOS> show version cluster-server all

Node cs068
--------------------------------------------------------------------------------
Software information:
---------------------
    COS CMTS Config File:   /srv/cableos/startup-config
    Image information:      Linux cs068 4.9.0-9-amd64 #1 SMP Debian 4.9.168-1+deb9u4 (2019-07-19) x86_64 GNU/Linux
    Image version:          1.9.1.0-6+auto36
    Installation date:      Mon Dec 19 14:41:10 EET 2016

Hardware information:
---------------------
    Device name:            cs068
    Flash memory installed:
    Main memory installed:  131539780 kB
    Platform type           CORE
    Processor type:         Intel(R) Xeon(R) CPU E5-2699 v4 @ 2.20GHz
    Uptime:                 1 day, 17:22

Modified packages information:
-----------------------------
    n/a

Node cs069
--------------------------------------------------------------------------------
Software information:
---------------------
    COS CMTS Config File:   /srv/cableos/startup-config
    Image information:      Linux cs069 4.9.0-9-amd64 #1 SMP Debian 4.9.168-1+deb9u4 (2019-07-19) x86_64 GNU/Linux
    Image version:          1.9.1.0-6+auto36
    Installation date:      Mon Dec 19 14:41:10 EET 2016

Hardware information:
---------------------
    Device name:            cs069
    Flash memory installed:
    Main memory installed:  131539780 kB
    Platform type           CORE
    Processor type:         Intel(R) Xeon(R) CPU E5-2699 v4 @ 2.20GHz
    Uptime:                 1 day, 17:22

Modified packages information:
-----------------------------
    cos-tftp-proxy       1.1-43  (expected: 1.1-42)
```

Related information

show images

show version

show version cluster-nic

show version cluster-server

install

show upgrade process

reboot passive all

reboot passive hitless

validate-iso-md5

snmp-server

Use the `snmp-server` command to enable and disable all running versions of the Simple Network Management Protocol (SNMP) agent operation.

`snmp-server { enabled | disabled }`

Syntax description

enabled	Enables SNMP agent operation.

disabled	Disables SNMP agent operation.

Default

By default, SNMP agent operation is disabled.

Command mode

Config mode.

Usage guidelines

The command `snmp-server enabled` must be committed to start SNMP operations.

Example

The following example disables the current running version of SNMP:

```
snmp-server disabled
```

Related information

snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps snmp
snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server host
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server user
snmp trap link-status

snmp-server community

Use the `snmp-server community` command to set up the community access string that permits access to the SNMP. To remove the specified community string, use the **no** form of this command.

`snmp-server community` *string* `[{ro | rw}]`
`no snmp-server community string`

Syntax description

string	The string is a password that permits access to the SNMP protocol.
`ro`	(Optional) Specifies read-only access. Authorized management stations are only able to retrieve MIB objects.
`rw`	(Optional) Specifies read-write access. Authorized management stations are able to both retrieve and modify MIB objects.

Default

By default, only read-only access is permitted.

Command mode

Config mode.

Usage guidelines

The no snmp-server command disables all versions of SNMP.

The first snmp-server command you enter enables all versions of SNMP.

NOTE: SNMP community strings are used with the SNMPv1 and SNMPv2c protocols only. SNMPv3 uses username/password authentication.

Examples

The following example assigns the community string **comaccess** to SNMP with read-only access:

```
snmp-server community comaccess ro
```

The following example removes the **comaccess** community string:

```
no snmp-server community comaccess
```

Related information

show version cable rpd
snmp-server contact
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps snmp
snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server host
snmp-server location

snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server user
snmp trap link-status
snmp-server community-encryption

snmp-server community-encryption

Use the `snmp-server community-encryption` command to manage community string encryption.

`snmp-server community-encryption` *encryption*

Syntax description

encryption	• enabled - Enables SNMP community string encryption • disabled - Disables SNMP community string encryption

Default

By default, SNMP community string encryption is disabled.

Command mode

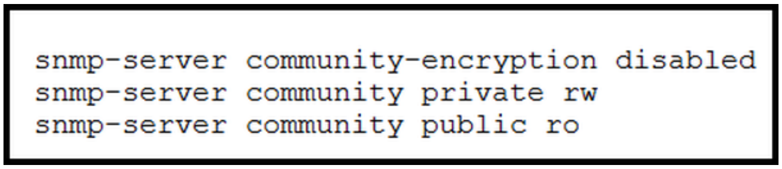
Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

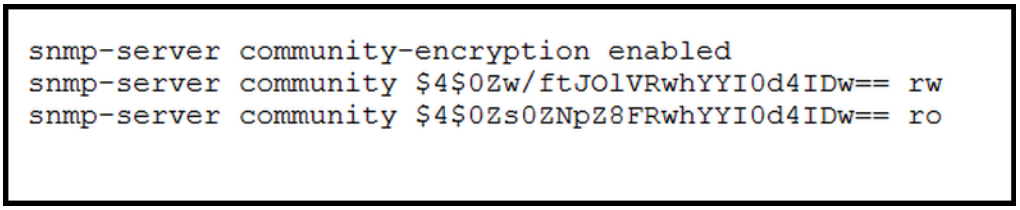
Examples

The example below shows how the community string is displayed in the output of the `show running-config snmp-server` command when encryption is disabled:



```
snmp-server community-encryption disabled
snmp-server community private rw
snmp-server community public ro
```

The example below shows how the same community string is displayed in the output of the `show running-config snmp-server` command when encryption is enabled:



```
snmp-server community-encryption enabled
snmp-server community $4$0Zw/ftJOlVRwhYYI0d4IDw== rw
snmp-server community $4$0Zs0ZNpZ8FRwhYYI0d4IDw== ro
```

Related information

snmp-server community

snmp-server contact

Use the `snmp-server contact` command to set up the system contact (sysContact) string. To remove the system contact information, use the **no** form of this command.

```
snmp-server contact text
no snmp-server contact
```

Syntax description

text	A string that describes the system contact information.

Default

By default, no system contact string is set.

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Example

The following example sets a system contact string:

```
snmp-server contact Dial System Operator at beeper # 27345
```

Related information

show version cable rpd
snmp-server community
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps snmp
snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server host
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name

snmp-server user

snmp trap link-status

snmp-server enable traps

Use the `snmp-server enable traps` command to enable all SNMP notifications (traps or informs) available on your system. To disable all available SNMP notifications, use the **no** form of this command.

```
snmp-server enable traps{notification-type  | all}
no snmp-server enable traps[notification-type]
```

Syntax description

`notification-type`	The type of notification (trap or inform) to enable or disable. If **all** is specified, all notifications available on the device are enabled. The notification type can be one of the following keywords only: • **cable**: See *snmp-server enable traps cable* • **snmp**: See *snmp-server enable traps snmp*

Default

By default, SNMP notification types are disabled.

Command mode

Config mode.

Usage guidelines

Entering this command with no notification-type keywords enables all notification types controlled by the command.

SNMP notifications can be sent as traps or inform requests. This command enables both traps and inform requests for the specified notification types. To specify whether the notifications should be sent as traps or informs, use the `snmp-server host [traps | informs]` command.

If you do not enter an `snmp-server enable traps` command, no notifications controlled by this command are sent. To configure the router to send these SNMP notifications, you must enter at least one `snmp-server enable traps` command. If you enter the command with no keywords, all notification types are enabled. If you enter the command with a keyword, only the notification type related to that keyword is enabled. To enable multiple types of notifications, you must issue a separate `snmp-server enable traps` command for each notification type and notification option.

The `snmp-server enable traps` command is used in conjunction with the `snmp-server host` command. Use the `snmp-server host` command to specify which host or hosts receive SNMP notifications. To send notifications, you must configure at least one `snmp-server host` command.

There are no limitations on the number of SNMP trap destinations supported by CableOS.

Example

The following example enables the router to send all traps to the host specified by the name myhost.harmonicinc.com, using the community string defined as public:

```
snmp-server enable traps
snmp-server host myhost.harmonicinc.com public
```

Related information

show version cable rpd
snmp-server community
snmp-server contact
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps rpd ssh-status
snmp-server enable traps snmp
snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server host
snmp-server informs
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server user
snmp trap link-status

snmp-server enable traps aaa-server status

Use the `snmp-server enable traps aaa-server status` command to enable authentication, authorization, and accounting (AAA) server state-change Simple Network Management Protocol (SNMP) notifications. To disable AAA server state-change SNMP notifications, use the **no** form of this command.

```
snmp-server enable traps aaa-server status
no snmp-server enable traps aaa-server status
```

Syntax description

This command has no arguments or keywords.

Default

SNMP notification types are disabled.

Command mode

Config mode.

Usage guidelines

SNMP notifications can be sent as traps or inform requests. This command enables both traps and inform requests.

This command controls (enables or disables) AAA Server state change notifications.

The `snmp-server enable traps` command is used in conjunction with the `snmp-server host` command. Use the `snmp-server host` command to specify which host or hosts receive SNMP notifications. To send notifications, you must configure at least one `snmp-server host` command.

Examples

The following example enables the router to send AAA server up/down informs to the host at the address myhost.harmonicinc.com using the community string defined as public:

```
snmp-server enable traps aaa_server
snmp-server host myhost.harmonicinc.com public
```

Related information

show version cable rpd

snmp-server community

snmp-server contact

snmp-server enable traps

snmp-server enable traps cable

snmp-server enable traps snmp

snmp-server enable traps user-mgmt user-change

snmp-server engineID

snmp-server group

snmp-server host

snmp-server location

snmp-server monitor core sensor temperature threshold

snmp-server monitor core sensor voltage threshold

snmp-server name

snmp-server user

snmp trap link-status

snmp-server enable traps cable

Use the `snmp-server enable traps cable` command to enable the sending of SNMP notifications for cable related events. To disable the sending of traps, use the **no** form of this command.

```
snmp-server enable traps cable [ cm-onoff ]
no snmp-server enable traps cable [ cm-onoff ]
```

Syntax description

cm-onoff	(Optional) Enables traps for CM online/offline status changes.

Default

Cable notifications are disabled.

Command mode

Config mode.

Usage guidelines

If you enter this command with none of the optional keywords, all cable related notifications are enabled (or disabled, if using the **no** form).

Examples

The following example enables the router to send SNMP traps of all cable related events:

```
snmp-server enable traps cable
```

Related information

show version cable rpd
snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps snmp
snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server host
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server user
snmp trap link-status

snmp-server enable traps core md-map-advance-changed

Use the `snmp-server enable traps core md-map-advance-changed` command to enable SNMP notifications of a new map-advance delay value. To disable the notifications, use the **no** form of this command.

```
snmp-server enable traps core md-map-advance-changed
no snmp-server enable traps core md-map-advance-changed
```

Syntax description

This command has no arguments or keywords.

Default

SNMP notifications are disabled.

Command mode

Config mode.

Examples

The following example enables the SNMP notification of a new map-advance delay value:

```
snmp-server enable traps core md-map-advance-changed
```

Related information

show cable latency history
show cable map-advance
show cable map-advance history
cable mac-domain * map-advance algorithm
cable mac-domain * map-advance

snmp-server enable traps core scep-event

Use the `snmp-server enable traps core scep-event` command to enable SNMP notifications of changes in SCEP certificate status (valid/failed). To disable the notifications, use the **no** form of this command.

```
snmp-server enable traps core scep-event
no snmp-server enable traps core scep-event
```

Syntax description

This command has no arguments or keywords.

Default

SNMP notifications are disabled.

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example enables the SNMP notification of changes in SCEP certificate status:

```
snmp-server enable traps core scep-event
```

Related information

system scep

scep enrollment

scep renewal

show system scep

snmp-server enable traps docsis-events

Use the `snmp-server enable traps docsis-events` command to enable the sending of SNMP notifications for DOCSIS events.

`snmp-server enable traps docsis-events` [`all` | `bpkm` | `dccak` | `dccreq` | `dccrsp` | `regack` | `regreq`]

Syntax description

all	Enables traps for all DOCSIS events
bpkm	Enables traps for BPKM failure events
dccack	Enables traps for the failure of Dynamic Channel Change Acknowledgement (DCC-ACK) requests
dccreq	Enables traps for the failure of Dynamic Channel Change Request (DCC-REQ) requests
dccrsp	Enables traps for the failure of Dynamic Channel Change Response (DCC-RSP) requests
regack	Enables traps for the failure of Registration Acknowledgement (REG-ACK) requests
regreq	Enables traps for the failure of Registration Request (REG-REQ) requests

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Example

The example below shows how to configure the system to send traps for all DOCSIS events:

```
snmp-server enable traps docsis-events all
```

Related information

cable event priority

cable event control

snmp-server enable traps rpd-events connectivity

Use the `snmp-server enable traps rpd-events` command to enable the sending of SNMP notifications for RPD link status changes.

```
snmp-server enable traps rpd-events connectivity
```

Syntax description

This command has no arguments or keywords.

Default

This command has no default value.

Command mode

Config mode.

Examples

The following example enables the SNMP notification of RPD link status changes:

```
snmp-server enable traps rpd-events connectivity
```

snmp-server enable traps rpd ssh-status

Use the `snmp-server enable traps rpd ssh-status` command to enable SNMP notifications of ssh login and logout events. To disable the notifications, use the **no** form of this command.

```
snmp-server enable traps rpd ssh-status
no snmp-server enable traps rpd ssh-status
```

Syntax description

This command has no arguments or keywords.

Default

SNMP notifications are disabled.

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example enables the SNMP notification of ssh login and logout events:

```
snmp-server enable traps rpd ssh-status
```

Related information

show version cable rpd
snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps snmp
snmp-server engineID
snmp-server group
snmp-server host
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server user
snmp trap link-status

snmp-server enable traps snmp

Use the `snmp-server enable traps snmp` command to enable the sending of RFC 1157 SNMP notifications. To disable the sending of RFC 1157 SNMP notifications, use the **no** form of this command.

```
snmp-server enable traps snmp [ authentication ] [ linkup ] [ linkdown ] [
coldstart ] [ warmstart ]
no snmp-server enable traps snmp [ authentication ] [ linkup ] [ linkdown ] [
coldstart ] [ warmstart ]
```

Syntax description

`authentication`	(Optional) Controls the sending of SNMP authentication failure notifications. An authenticationFailure(4) trap signifies that the sending device is the addressee of a protocol message that is not properly authenticated. The authentication method depends on the version of SNMP being used. For SNMPv1 or SNMPv2c, authentication failure occurs for packets with an incorrect community string. For SNMPv3, authentication failure occurs for packets with an incorrect SHA/MD5 authentication key or for a packet that is outside of the authoritative SNMP engine's window (for example, falls outside of configured access lists or time ranges).
`linkup`	(Optional) Controls the sending of SNMP linkUp notifications. A linkUp(3) trap signifies that the sending device recognizes that one of the communication links represented in the agent's configuration has come up.
`linkdown`	(Optional) Controls the sending of SNMP linkDown notifications. A linkDown(2) trap signifies that the sending device recognizes a failure in one of the communication links represented in the agent's configuration.
`coldstart`	(Optional) Controls the sending of SNMP coldStart notifications. A coldStart(0) trap signifies that the sending device is reinitializing itself such that the agent's configuration or the protocol entity implementation may be altered.
`warmstart`	(Optional) Controls the sending of SNMP warmStart notifications. A warmStart(1) trap signifies that the sending device is reinitializing itself such that neither the agent configuration nor the protocol entity implementation is altered.

Default

SNMP notifications are disabled.

If you enter this command with none of the optional keywords, all RFC 1157 SNMP notifications are enabled (or disabled, if using the **no** form).

Command mode

Config mode.

Usage guidelines

SNMP notifications can be sent as traps or inform requests. This command enables both traps and inform requests for the specified notification types.

If you do not enter an `snmp-server enable traps snmp` command, no notifications controlled by this command are sent. To configure the router to send these SNMP notifications, you must enter at least one `snmp-server enable traps snmp` command. If you enter the command with no keywords, all notification types are enabled. If you enter the command with a keyword, only the notification type related to that keyword is enabled.

The `snmp-server enable traps snmp` command is used in conjunction with the `snmp-server host` command. Use the `snmp-server host` command to specify which host or hosts receive SNMP notifications. To send notifications, you must configure at least one `snmp-server host` command.

For a host to receive a notification controlled by this command, both the `snmp-server enable traps` command and the `snmp-server host` command for that host must be enabled. If the notification type is not controlled by this command, just the appropriate `snmp-server host` command must be enabled.

The **snmp-server enable traps snmp** [**linkup**] [**linkdown**] form of this command globally enables or disables SNMP linkUp and linkDown traps. After enabling either of these traps globally, you can disable these traps on specific interfaces using the `no snmp trap link-status` command in interface configuration mode. Note that on the interface level, linkUp and linkDown traps are enabled by default. This means that you do not have to enable these notifications on a per-interface basis. However, linkUp and linkDown notifications will not be sent unless you enable them globally using the `snmp-server enable traps snmp` command.

Example

The following example enables the router to send all SNMPv2 inform notifications to the host myhost.harmonicinc.com:

```
snmp-server enable traps snmp
snmp-server host myhost.harmonicinc.com informs version 2c
```

Related information

show version cable rpd
snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server host
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server user
snmp trap link-status

snmp-server enable traps user-mgmt user-change

Use the `snmp-server enable traps user-mgmt user-change` command to enable SNMP notifications of user management actions (add/delete). To disable the notifications, use the **no** form of this command.

```
snmp-server enable traps user-mgmt user-change
no snmp-server enable traps user-mgmt user-change
```

Syntax description

This command has no arguments or keywords.

Default

SNMP notifications are disabled.

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example enables the SNMP notification of user management actions:

```
snmp-server enable traps user-mgmt user-change
```

Related information

show version cable rpd

snmp-server community

snmp-server contact

snmp-server enable traps

snmp-server enable traps aaa-server status

snmp-server enable traps cable

snmp-server enable traps snmp

snmp-server engineID

snmp-server group

snmp-server host

snmp-server location

snmp-server monitor core sensor temperature threshold

snmp-server monitor core sensor voltage threshold

snmp-server name

snmp-server user

snmp trap link-status

snmp-server engineID

Use the `snmp-server engineID` command to configure a name for the local SNMP engine on the router. To remove the configured engine ID, use the **no** form of the command.

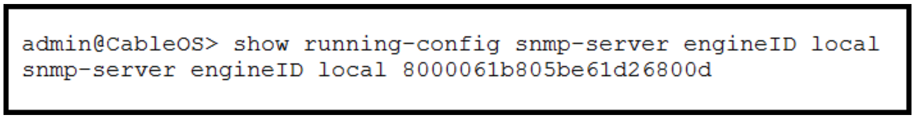
`snmp-server engineID` *local engineid-string*
`no snmp-server engineID`

Syntax description

local	Specifies the local copy of SNMP on the router. (You must specify either local or remote.) **NOTE:** CableOS does not support SNMP remote engines.
engineid-string	An octet string (5-32 octets) that will be used for generating encrypted passwords (localized keys).

Default

An SNMP engine ID is generated automatically but is not displayed or stored in the running configuration. You can display the default or configured engine ID by using the `show running-config snmp-server engineID local` command.



```
admin@CableOS> show running-config snmp-server engineID local
snmp-server engineID local 8000061b805be61d26800d
```

Command mode

Config mode.

Usage guidelines

You do not need to specify the entire 24-character engine ID if it contains trailing zeros. Specify only the portion of the engine ID up until the point where only zeros remain in the value. For example, to configure an engine ID of 123400000000000000000000, you specify only the value 1234: snmp-server engineID local 1234.

Changing the value of the SNMP engine ID has important side-effects. A user's passwords (*auth-password* and *privacy-password* entered on the command line) is converted to an MD5 or SHA security digest. This digest is based on both the password and the local engine ID. The command line password is then destroyed, as required by RFC 2274. Because of this deletion, if the local value of the engine ID changes, the security digests of SNMPv3 users will be invalid, and the users will have to be reconfigured.

To remove the configured engineID, use the **no** form of the command.

Examples

The following example sets the local engine ID to 80001f8804717765727478:

```
snmp-server engineID local 80001f8804717765727478
```

Related information

show version cable rpd
snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps snmp
snmp-server enable traps user-mgmt user-change
snmp-server group
snmp-server host
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server user
snmp trap link-status

snmp-server group

Use the `snmp-server group` command to configure a new SNMP group or a table that maps SNMP users to SNMP views. To remove an SNMP group, use the **no** form of this command.

```
snmp-server group groupname v3{auth | noauth | priv}read readview [write
writeview]
no snmp-server group
```

Syntax description

`v3`	The security model used.
`auth`	Specifies that the packet will be authenticated without encryption.
`noauth`	Specifies no authentication of packets.
`priv`	Specifies that the packets will be both authenticated and encrypted. The encryption algorithms used are AES-128 or DES.
`read`	Enables you to specify a read view.
`readview`	A string (not to exceed 64 characters) that is the name of the view that enables you only to view the contents of the agent. Currently only **all** is allowed, which grants access to the whole SNMP OID tree.
`write`	(Optional) Enables you to specify a write view.

`writeview`	A string (not to exceed 64 characters) that is the name of the view that enables you only to view the contents of the agent. Currently only **all** is allowed, which grants access to the whole SNMP OID tree.

Default

There are six predefined groups:

- *ro-no-auth*: **no-auth read all**
- *ro-auth*: **auth read all**
- *ro-priv*: **priv read all**
- *rw-no-auth*: **no-auth read all write all**
- *rw-auth*: **auth read all write all**
- *rw-priv*: **priv read all write all**

Command mode

Config mode.

Usage guidelines

Before you can remove a group, you must first remove all the group's users.

Example

The following is an example of a full access group:

```
snmp-server group admin-group v3 priv read all write all
```

Related information

show version cable rpd

snmp-server community

snmp-server contact

snmp-server enable traps

snmp-server enable traps aaa-server status

snmp-server enable traps cable

snmp-server enable traps snmp

snmp-server enable traps user-mgmt user-change

snmp-server engineID

snmp-server host

snmp-server location

snmp-server monitor core sensor temperature threshold

snmp-server monitor core sensor voltage threshold

snmp-server name

snmp-server user

snmp trap link-status

snmp-server host

Use the `snmp-server host` command to specify the recipient of an SNMP notification. To remove the host, use the **no** form of this command.

```
snmp-server host host-addr{traps  | informs}version
{1  | 2c  | 3}
{auth  | noauth  | priv  | community-string}
[ udp-port port ] [ notification-type ]
no snmp-server host host
```

Syntax description

`host-addr`	Name or Internet address of the host (the targeted recipient).
`traps`	Sends SNMP traps to this host.
`informs`	Sends SNMP informs to this host.
`version`	Version of the SNMP used to send the traps: • **1**—SNMPv1. This option is not available with informs. • **2c**—SNMPv2c. • **3**—SNMPv3. The following optional keywords are available with this option: • auth (Optional). Enables Message Digest 5 (MD5) and Secure Hash Algorithm (SHA) packet authentication • noauth (Default). The noAuthNoPriv security level. This is the default if the [auth | noauth | priv] keyword choice is not specified. • priv (Optional). Enables the Advanced Encryption Standard (AES) or Data Encryption Standard (DES) packet encryption (also called "privacy").
`community-string`	Password-like community string sent with the notification operation.
udp-port *port*	(Optional) UDP port of the host to use. The default is 162.
`notification-type`	(Optional) Type of notification to be sent to the host. If no type is specified, all notifications are sent. The notification type can be one or more of the following keywords: • **snmp** - Sends any enabled RFC 1157 SNMP linkUp, linkDown, authenticationFailure, warmStart, and coldStart notifications. • **cable** – Sends notifications about cable related events.

Default

This command is disabled by default. No notifications are sent.

Command mode

Config mode.

Usage guidelines

SNMP notifications can be sent as traps or inform requests. Traps are unreliable because the receiver does not send acknowledgments on receipt and the sender cannot determine if the traps were received. However, an SNMP entity that receives an inform request acknowledges the message with an SNMP response PDU. If the sender never receives the response, the inform request can be sent again. Thus, informs are more likely to reach their intended destination.

However, informs consume more resources in the agent and in the network. Unlike a trap, which is discarded as soon as it is sent, an inform request must be held in memory until a response is received, or the request times out. Also, traps are sent only once, while an inform may be retried several times. The retries increase traffic and contribute to a higher overhead on the network.

If you do not enter an `snmp-server host` command, no notifications are sent. To configure the router to send SNMP notifications, you must enter at least one `snmp-server host` command. If you enter the command with no keywords, all trap types are enabled for the host.

To enable multiple hosts, you must issue a separate `snmp-server host` command for each host. You can specify multiple notification types in the command for each host.

When multiple **snmp-server host** commands are given for the same host and kind of notification (trap or inform), each succeeding command overwrites the previous command. Only the last `snmp-server host` command will be in effect. For example, if you enter an `snmp-server host inform` command for a host and then enter another `snmp-server host inform` command for the same host, the second command replaces the first.

The `snmp-server host` command is used in conjunction with the `snmp-server enable` command. Use the `snmp-server enable` command to specify which SNMP notifications are sent globally. For a host to receive most notifications, at least one `snmp-server enable` command and the `snmp-server host` command for that host must be enabled.

However, some notification types cannot be controlled with the `snmp-server enable` command. For example, some notification types are always enabled. Other notification types are enabled by a different command. For example, linkUpDown notifications are controlled by the `snmp trap link-status` command. These notification types do not require an `snmp-server enable` command.

A notification-type option's availability depends on the router type and CableOS software features supported on the router. For example, the **envmon** notification-type is available only if the environmental monitor is part of the system. To see what notification types are available on your system, use the command help **?** at the end of the `snmp-server host` command.

The @ symbol is used as a delimiter between the community string and the context in which it is used. For example, specific VLAN information in BRIDGE-MIB may be polled using community@VLAN_ID (for example, public@100) where 100 is the VLAN number. Avoid using the @ symbol as part of the SNMP community string when configuring this command.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Example

The following example sends RFC 1157 SNMP traps to the host specified by the name harmonicinc.com. Other traps are enabled, but only SNMP traps are sent because only **snmp** is specified in the `snmp-server host` command. The community string is defined as **comaccess**.

```
snmp-server enable traps
snmp-server host myhost.harmonicinc.com comaccess snmp
```

Related information

show version cable rpd
snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps snmp
snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server user
snmp trap link-status

snmp-server informs

Use the `snmp-server informs` command to set the inform request options.

`snmp-server informs` [`retries retries`] [`timeout seconds`] [`pending pending`]

Syntax description

`retries`	(Optional) The maximum number of times to resend an inform request. The valid range is from 1 - 100. The default value is 3.
`seconds`	(Optional) The number of seconds to wait for an acknowledgment before resending. The valid range is from 1 - 42949671. The default value is 15 seconds.

`pending`	(Optional) The maximum number of informs waiting for acknowledgments at any one time. When the maximum is reached, older pending informs are discarded. The valid range is from 1 - 4294967295.The default value is 25.

Default

The default values are described in the Syntax description.

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example increases the pending queue size if you are seeing a large number of inform drops:

```
snmp-server informs pending 50
```

The following example decreases the default timeout if you are sending informs over very fast links:

```
snmp-server informs timeout 5
```

The following example increases the retry count if you are sending informs over unreliable links. Because informs will be sitting in the queue for a longer period of time, you may need to increase the pending queue size.

```
snmp-server informs retries 10 pending 45
```

Related information

snmp-server enable traps

snmp-server location

Use the `snmp-server location` command to set the system location (sysLocation) string. To remove the system contact information, use the **no** form of this command.

```
snmp-server location text
no snmp-server location
```

Syntax description

`text`	String that describes the system location information.

Default

No system location string is set.

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example illustrates a system location string:

```
snmp-server location CentralOffice
```

Related information

show version cable rpd
snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps snmp
snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server host
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server user
snmp trap link-status

snmp-server monitor core sensor temperature threshold

Use the `snmp-server monitor core sensor temperature threshold` command to configure threshold values for the temperature sensors.

`snmp-server monitor core sensor temperature` *sensor-name* `threshold [ low` *lower-threshold* `] [ high` *upper-threshold* `]`

Syntax description

sensor-name	Name of the sensor. All names can be found in the BMC control panel, or in auto completion for this parameter.

lower-threshold	The value of the lower threshold, in Centigrade, to a resolution of three decimal places.
upper-threshold	The value of the higher threshold, in Centigrade, to a resolution of three decimal places.

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

If the temperature crosses one of these thresholds, the SNMP temperature-related trap will be sent (if it has been enabled).

Example

The following example sets the temperature thresholds as 10.000 degrees and 80.000 degrees for a sensor called BB Lft Rear Temp:

```
snmp-server monitor core sensor temperature "BB Lft Rear Temp" threshold low 10.000
 high 80.000
```

Related information

show environment temperature
snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps snmp
snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server host
snmp-server location
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server user
snmp trap link-status

snmp-server monitor core sensor voltage threshold

Use the `snmp-server monitor core sensor voltage threshold` command to configure threshold values for the voltage sensors.

`snmp-server monitor core sensor voltage` *sensor-name* `threshold [ low` *lower-threshold* `]` `[ high` *upper-threshold* `]`

Syntax description

sensor-name	Name of the sensor. All names can be found in the BMC control panel, or in auto completion for this parameter.
lower-threshold	The value of the lower threshold, in volts, to a resolution of three decimal places.
upper-threshold	The value of the higher threshold, in volts, to a resolution of three decimal places.

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

If the voltage crosses one of these thresholds, the SNMP temperature-related trap will be sent (if it has been enabled).

Example

The following example sets the voltage thresholds as 11.260 volts and 12.840 volts for a sensor called BB +12.0V:

```
snmp-server monitor core sensor temperature "BB +12.0V" threshold low 11.260 high
 12.840
```

Related information

show environment voltage

snmp-server community

snmp-server contact

snmp-server enable traps

snmp-server enable traps aaa-server status

snmp-server enable traps cable

snmp-server enable traps snmp

snmp-server enable traps user-mgmt user-change

snmp-server engineID

snmp-server group

snmp-server host
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server name
snmp-server user
snmp trap link-status

snmp-server name

Use the `snmp-server name` command to configure the system name string.

`snmp-server name` *system-name*

Syntax description

system-name	The system name string, which will displayed through SNMPv2-MIB::sysName SNMP object.

Default

There is no default value for this command.

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Examples

The following example configures the system name as MasterSystem:

```
snmp-server name MasterSystem
```

Related information

snmp-server community
snmp-server contact
snmp-server enable traps
snmp-server enable traps aaa-server status
snmp-server enable traps cable
snmp-server enable traps snmp
snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server host
snmp-server location
snmp-server monitor core sensor temperature threshold

snmp-server monitor core sensor voltage threshold
snmp-server user
snmp trap link-status

snmp-server user

Use the `snmp-server user` command to configure a new user to an SNMP group. To remove a user from an SNMP group, use the **no** form of the command.

`snmp-server user` *username groupname* `v3 [ encrypted ] [ auth ] { md5 | sha }` *auth-password* `[ privacy-protocol { aes | des } [ privacy-password ] ] ]`
`no snmp-server user`

Syntax description

username	The name of the user on the host that connects to the agent.
groupname	The name of the group to which the user belongs.
`remote`	(Optional) Specifies a remote SNMP entity to which the user belongs, and the hostname or IP address of that entity.
`v3`	Specifies that the SNMPv3 security model should be used. Allows the use of the encrypted and/or auth keywords.
`encrypted`	(Optional) Specifies whether the password appears in encrypted format (a series of digits, masking the actual characters of the string).
`auth`	(Optional) Specifies which authentication level should be used.
`md5`	The HMAC-MD5-96 authentication level.
`sha`	The HMAC-SHA-96 authentication level.
auth-password	A string that enables the agent to receive packets from the host. The character limit depends on the type of password: • 8-64 characters for cleartext password • 32 characters for an encrypted password with the md5 authentication protocol • 40 characters for an encrypted password with the SHA authentication protocol.
`privacy-protocol`	(Optional) Enables you to choose the encryption method that should be used. The encryption algorithm used by default is DES.

`aes|des`	• Specifies the AES-128 (Advanced Encryption Standard) encryption method • Specifies the DES (Data Encryption Standard) encryption method
`privacy-password`	(Optional) An encryption password. If omitted, then auth-password is used for encryption.

Default

There are six predefined groups:

- *ro-no-auth*: **no-auth read all**
- *ro-auth*: **auth read all**
- *ro-priv*: **priv read all**
- *rw-no-auth*: **no-auth read all write all**
- *rw-auth*: **auth read all write all**
- *rw-priv*: **priv read all write all**

Command mode

Config mode.

Usage guidelines

This command allows you to create an SNMPv3 user without a password. Such users can only have access if the group they are assigned to has a **noauth** security level.

NOTE: With this command, SNMPv3 users do not require a password. However, the security level of the associated group must be set to `noauth` . If the security level of the associated group is set to `priv` , SNMPv3 users will need the `privacy-password`. If the `privacy-password` is omitted, then the *auth-password* string is used.

NOTE: Only one user per host can receive notifications.Other users configured with the same host parameters will not receive notifications.

Example

The following example creates the SNMPv3 user jbrown in the group admins (assuming it exists) using the md5 authentication protocol and with a password "gY6tf097":

```
snmp-server user jbrown admins v3 auth md5 gY6tf097
```

Related information

show version cable rpd

snmp-server community

snmp-server contact

snmp-server enable traps

snmp-server enable traps aaa-server status

snmp-server enable traps cable

snmp-server enable traps snmp

snmp-server enable traps user-mgmt user-change
snmp-server engineID
snmp-server group
snmp-server host
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server view
snmp trap link-status

snmp-server view

Use the `snmp-server view` command to create or update a view entry. To remove the specified SNMP server view entry, use the **no** form of the command.

`snmp-server view` *view-name oid-tree* `{included | excluded}`
`no snmp-server view` *view-name*

Syntax description

view-name	Label for the view record that you are updating or creating. The name is used to reference the record.
oid-tree	Object identifier of the ASN.1 subtree to be included or excluded from the view.
`included	excluded`	Type of view. You must specify either **included** or **excluded**.

Default

By default, the view is empty. There are two predefined views: **all** (whole SNMP tree) and **none** (empty tree).

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Example

The following example creates a view that includes all objects in the MIB-II system group:

```
snmp-server view example-view system included
snmp-server view example-view system.7 excluded
snmp-server view example-view  ifEntry.*.1 included
```

Related information

snmp-server group

snmp-server name

snmp-server monitor core sensor temperature threshold

snmp-server monitor core sensor voltage threshold

snmp-server user

snmp trap link-status

Use the `snmp trap link-status` command to enable SNMP link trap generation. To disable SNMP link traps, use the **no** form of this command.

```
snmp trap link-status
no snmp trap link-status
```

Syntax description

This command has no arguments or keywords.

Default

SNMP link traps are sent when an interface goes up or down.

Command mode

Interface configuration.

Usage guidelines

By default, SNMP link traps are sent when an interface goes up or down. For interfaces expected to go up and down during normal usage, such as ISDN interfaces, the output generated by these traps may not be useful.

Examples

The following example disables the sending of SNMP link traps related to the ISDN BRI 0 interface:

```
interface bri 0
no snmp trap link-status
```

Related information

show version cable rpd

snmp-server community

snmp-server contact

snmp-server enable traps

snmp-server enable traps aaa-server status

snmp-server enable traps cable

snmp-server enable traps snmp

snmp-server enable traps user-mgmt user-change

snmp-server engineID
snmp-server group
snmp-server host
snmp-server location
snmp-server monitor core sensor temperature threshold
snmp-server monitor core sensor voltage threshold
snmp-server name
snmp-server user

spanning-tree mstp

Use the `spanning-tree mstp` command to define an MSTP ring for RPD Closed Loop Protection.

`spanning-tree mstp region` *region-id* `name` *region-name* `revision` *revision* `instance` *instance-id* `vlan` *vlan-list*

Syntax description

region-id	Arbitrary Harmonic CLI index limit for testing.
region-name	A string of 1-32 characters. This value must match the DAAS MTP region name.
revision	Valid values are from : 0..65535 This value must match the DAAS MSTP revision.
instance-id	Valid values are from 1..63 (0 is a reserved instance). The MSTP protocol limits to 64 instances per region. When setting MSTP instances on the configuration they must start with 1 and be consecutive numbers.
vlan-list	Either a comma-separated list of single vlan-ids (range 1..4093) or <start>-<end> vlan ID ranges. The IDs must match the DAAS MSTP region association of the *instance-id* to the *vlan-list*.

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

This command is used in conjunction with the `cable rpd * mstp` command. For more details, see the *CableOS User Guide*.

Examples

The example below sets up the spanning tree in preparation for configuring two rings on the same CRE/ DAAS.

```
spanning-tree mstp region 1
  name "cre-ha1"
  revision 1
  instance 1 vlan 2001
  instance 2 vlan 2002
```

Related information

cable rpd * mstp

show cable rpd spanning-tree

set cable rpd spanning-tree

ssh

Use the `ssh` command to enable and disable the ssh connection to the Core.

`ssh [{enable | disable}]`

Default

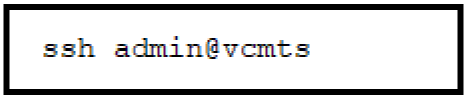
By default, the connection is enabled.

Command mode

Config mode.

Example

The following example enables the ssh connection:



```
ssh admin@vcmts
```

Related information

telnet

start logging monitor

Use the `start logging monitor` command to start displaying Syslog messages to the console according to the definitions in the logging monitor command.

`start logging monitor`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

This command enables users to track the log messages being sent to Syslog.

Examples

The following example starts displaying the log:

```
start logging monitor
```

Related information

logging monitor
stop logging monitor
terminal monitor

stop logging monitor

Use the `stop logging monitor` command to stop displaying Syslog messages to the console.

`stop logging monitor`

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

This command enables users to stop tracking the log messages being sent to Syslog.

Examples

The following example stops displaying the log:

```
stop logging monitor
```

Related information

logging monitor
start logging monitor
terminal monitor

system ipsec tunnel

Use the `system ipsec tunnel` command to configure the characteristics of the IPsec tunnel.

`system ipsec tunnel` [`admin-state` *admin-state*] [`remote-ip` *ip-address*] [`dscp` *value*] [`certificate` *tunnel cert-name*] [`path-mtu` *mtu-value*] [`rightsubnet` *subnet*]

Syntax description

admin-state	This parameter activates the IPsec tunnel. If you do not activate the tunnel, traffic will not be encrypted within the IPsec tunnel, even if it has been configured and exists. Valid values are **up** or **down**. You must activate the IPSEC tunnel to use the feature.
ip-address	The IPv4 or IPv6 address of the IPsec tunnel endpoint.
dscp *value*	The value of the DSCP.
certificate	The system allows you to configure unique certificates for each IPsec tunnel. The number of tunnels depends on the number of NSI.prov interfaces configured with the `cable provisioning core-ip-address-pool count` command. The valid entries for this entry are 1, 2, 3, 4, and must be entered sequentially.
cert-name	The name of the certificate you installed including the file suffix. For example, if the certificate file name is "Cert123.der", enter Cert123.der.
path-mtu	The configured MTU value in bytes. Range = 1500–2200 (integer) If you do not enter this value, the tunnel will use the system-configured MTU value.

rightsubnet	Defines the remote IPv4/IPv6 subnet that is behind the IPsec firewall.
	For example:
	`system ipsec tunnel rightsubnet 1.1.1.0/24`
	`system eclipse tunnel rightsubnet 3000:200:200:126::/64`
	The IP address portion which is not covered by the mask should be 0.
	For example:
	`1.1.1.0/24`
	Conversely, `1.1.1.1/24` would be incorrect because the 4th byte is not 0.
	The same applies to IPv6.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

For more information on how to configure the LI IPsec tunnel, see the CableOS User Guide.

Related information

show system ipsec tunnel state

cable provisioning core-ip-address-pool

system management in-band-ssh-password

Use the `system management in-band-ssh-password` command to enable or disable SSH passwords through the in-band connection.

```
system management in-band-ssh-password
```

Syntax description

enable	Enables SSH passwords.
disable	Disables SSH passwords.

Default

By default the user cannot log in to the shell through the in-band connection.

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

system management ip-address

Use the `system management ip-address` command to configure the System Management IPv4 address.

`system management ip-address` *ip*

Syntax description

ip	The IP address for System Management

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

To configure system management global config, use the system management configuration sub container.

To configure the IPv6 address, use the `system management ipv6-address` command.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Related information

system management sonar-service

system management telemetry

system management user

system management ipv6-address

system management ipv6-address

Use the `system management ipv6-address` command to configure the System Management IPv6 address.

`system management ipv6-address` *ipv6-address* `ipv6-gw-address` *ipv6-gw-address*

Syntax description

ipv6-address	The IPv6 address for System Management
ipv6-gw-address	The IPv6 gateway address for System Management with a subnet mask.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

To configure system management global config, use the system management configuration sub container.

To configure the IPv4 address, use the `system management ip-address` command.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Examples

```
system management ipv6-address 192:99:1::10 ipv6-gw-address  192:99:1::1/120
```

Related information

system management ip-address

system management netconf

Use the `system management netconf` command to allow the use of NETCONF.

`system management netconf` *admin-state*

Syntax description

admin-state	Either enable or disable.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

Before enabling NETCONF, customers must co-ordinate with Harmonic, as the use of NETCONF requires a license.

system management snmp fast-counters

Use the `system management snmp fast-counters` command to enable and disable the counters for fast SNMP pollers.

```
system management snmp fast-counters { disabled | enabled }
```

Syntax description

`disabled|enabled`	Enables or disables the counters for the SNMP fast pollers. The default is **disabled**.

Default

By default, SNMP counters for fast pollers are disabled.

Command mode

Config mode

Usage guidelines

For fast counters added prior to release 1.14

With this option enabled, the counters for fast SNMP pollers will be updated approximately every second for the next 10 seconds after the SNMP request. At other times the default polling interval is approximately 15 seconds.

For fast counters added in release 1.14

There are two types of new fast counters:

- US counters for CM Upstream channels (SNMP table hrmIf3CmtsCmUsStatusTable)
- DS counters for DS service flows (SNMP table hrmQosServiceFlowStatsTable)

- These counters will be updated once per second in force polling mode (described below)
- The counters include a timestamp object that contains a timestamp in the UTC time zone of hen the counter was last updated. This timestamp can be used for bandwidth calculations (described below)

Polling modes

There are two polling modes:

- Standard polling - update interval is approximately every 15 sec
  - Standard polling is always enabled
  - The goal of standard polling is updating the counters for all US channels and DS service flows that exist on the server
- Force polling - update interval is approximately every 1 sec
  - Force polling mode has higher threshold values
  - Force polling mode is disabled by default
  - Force polling mode is triggered for specific DS/US counters - for those which you requested via SNMP
  - Force polling mode will work for approximately 15 seconds after being triggered
  - Force polling mode is limited by the thresholds discussed in the *Throttling* section belowbelow

Bandwidth calculation example using timestamps

Assume that the following `snmpget` request has been performed twice with a one second delay between them:

```
snmpget ... hrmQosServiceFlowStatsTimestamp.mdIfIndex1.sfId1
      hrmQosServiceFlowStatsOctets.mdIfIndex1.sfId1
```

where:

- mdIfIndex1 - is the ifIndex of s a random MAC Domain
- sfId1 - is the ID of a random Service Flow in the MAC Domain with an ifIndex equal to mdIfIndex1

Each request returns a timestamp and the number of octets. These are represented as T1, O1 and T2, O2 respectively. The calcualtion of the traffic bandwidth (in bytes per second) is:

```
((O2 - O1) / (T2 - T1)
```

Throttling

Force polling throttling protects the system from degradation due to over-polling

The throttling thresholds for the US counters (hrmIf3CmtsCmUsStatusTable):

- Only one Cable Modem per MAC Domain
- The maximum number of these MAC Domains is twenty
- The force polling will be enabled for all US channels of the Cable Modem

The throttling thresholds for DS counters (hrmQosServiceFlowStatsTable):

There can be no more than forty service flows. For example, force polling can be triggered for forty Service Flows in a single MAC Domain, or for twenty Service Flows in one MAC Domain and a additional twenty Service Flows in a second MAC Domain.

Limitations

For fast counters added prior to release 1.14

- No more than 2 MAC Domains can provide fast counters update simultaneously (either by private or public MIBs together)
- The fast counters update for the Harmonic Proprietary MIBs will be triggered after the first SNMP request
- The fast counters update for the public MIBs will be triggered after the second SNMP request that arrives in a period of no more than 3 seconds
- The execution of `snmpbulkwalk` and `snmpbulkget` commands will not trigger the fast counters polling.

For fast counters added in release 1.14

- Force polling that was triggered by an SNMP request cannot be disabled via CLI or SNMP
- Standard polling is enabled by default
- If a CM resets, then its counters may be still available via SNMP during 1-2 standard polling periods (15-30 sec)

Supported MIBs

The following MIBS are supported:

Standard MIBs

MIB object	OID
docsIfSigQUnerroreds	1.3.6.1.2.1.10.127.1.1.4.1.2
docsIfSigQCorrecteds	1.3.6.1.2.1.10.127.1.1.4.1.3
docsIfSigQUncorrectables	1.3.6.1.2.1.10.127.1.1.4.1.4
docsIfSigQSignalNoise	1.3.6.1.2.1.10.127.1.1.4.1.5
docsIfUpChannelModulationProfile	1.3.6.1.2.1.10.127.1.1.2.1.4

Harmonic proprietary MIBs

MIB object	OID
hrmIfSignalQualityTable	1.3.6.1.4.1.1563.10.2.3.116.1.4.5
hrmIfSignalQualityEntry	1.3.6.1.4.1.1563.10.2.3.116.1.4.5.1
hrmIfSigQUnerroreds	1.3.6.1.4.1.1563.10.2.3.116.1.4.5.1.1
hrmIfSigQCorrecteds	1.3.6.1.4.1.1563.10.2.3.116.1.4.5.1.2
hrmIfSigQUncorrectables	1.3.6.1.4.1.1563.10.2.3.116.1.4.5.1.3
hrmIfSigQSignalNoise	1.3.6.1.4.1.1563.10.2.3.116.1.4.5.1.4
hrmIfSigQUpChannelModulationProfile	1.3.6.1.4.1.1563.10.2.3.116.1.4.5.1.5

US Counters (added in release 1.14)

MIB object	OID
hrmIf3CmtsCmUsStatusTable	1.3.6.1.4.1.1563.10.2.3.116.1.4.7
hrmIf3CmtsCmRegStatusId	1.3.6.1.4.1.1563.10.2.3.116.1.4.7.1.1

MIB object	OID
hrmIf3CmtsCmUsStatusChIfIndex	1.3.6.1.4.1.1563.10.2.3.116.1.4.7.1.2
hrmIf3CmtsCmUsStatusTimestamp	1.3.6.1.4.1.1563.10.2.3.116.1.4.7.1.3
hrmIf3CmtsCmUsStatusUnerroreds	1.3.6.1.4.1.1563.10.2.3.116.1.4.7.1.4
hrmIf3CmtsCmUsStatusCorrecteds	1.3.6.1.4.1.1563.10.2.3.116.1.4.7.1.5
hrmIf3CmtsCmUsStatusUncorrectables	1.3.6.1.4.1.1563.10.2.3.116.1.4.7.1.6
hrmIf3CmtsCmUsStatusSignalNoise	1.3.6.1.4.1.1563.10.2.3.116.1.4.7.1.7

DS Counters (added in release 1.14)

MIB object	OID
hrmQosServiceFlowStatsTable	1.3.6.1.4.1.1563.10.2.3.116.1.4.8
hrmQosServiceFlowStatsTimestamp	1.3.6.1.4.1.1563.10.2.3.116.1.4.8.1.1
hrmQosServiceFlowStatsOctets	1.3.6.1.4.1.1563.10.2.3.116.1.4.8.1.2
hrmQosServiceFlowStatsPkts	1.3.6.1.4.1.1563.10.2.3.116.1.4.8.1.3

Examples

The following command enables counters for SNMP fast pollers:

```
admin @ CableOS> config
admin @ CableOS (config) # system management snmp fast-counters enabled
admin @ CableOS (config) # commit
```

system management sonar-service

Use the `system management sonar-service` command to enable/disable and configure the sonar service.

`system management sonar-service` *enable/disable* `cert` *cert-name* `password` *password*

Syntax description

enable/disable	Enables or disables the sonar service
cert-name	The certificate file name to be used by the sonar agent. This file should be manually installed in the CableOS.
password	The encrypted string representing the sonar user password. This field is available only if the sonar service is enabled. It will be used for connection authentication from sonar to the sonar agent http service.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

There are no additional Usage Guidelines for this command.

Example

```
system management sonar-service enable cert sonar.pub
 password $6$V0ZAZBowdxq.3W.x$RM9FRAxfzpNZi56xToxkN9KhbXDO/
iEkUldqXYJOIjaXQ8a92tacp2nKqNpd.rjjbqtTktekmhrOljsyEBhot.
```

Related information

system management ip-address

system management telemetry

system management user

system management sshd extended-security

Use the `system management sshd extended-security` command to ensure that SSH only uses the most secure security options.

`system management sshd extended-security` [`enabled` | `disabled`]

Syntax description

`enabled`|`disabled`	The default value is **disabled**.

Default

See the syntax description.

Command mode

Config mode.

Usage guidelines

SSH CLI supports the following SSH algorithm options:

- *key-exchange algorithms*: **diffie-hellman-group14-sha1**, **diffie-hellman-group-exchange-sha256**, diffie-hellman-group-exchange-sha1, diffie-hellman-group1-sha1
- *mac algorithms*: **hmac-sha1**, **hmac-sha2-256**, **hmac-sha2-512**, hmac-md5, hmac-sha1-96, hmac-md5-96
- *encryption algorithms*: **aes128-ctr**, **aes192-ctr**, **aes256-ctr**, aes128-cbc, aes256-cbc, 3des-cbc

The **bold** options are considered as more secure options. When an SSH client connects to an SSH server, they negotiate and agree on the best security option both support. Using this command limits the choices to only the more secure options.

Using this command to enable extended security will prevent these SSH vulnerabilities from occurring:

- SSH Server Supports 3DES Cipher Suite
- SSH Server Supports Weak Key Exchange Algorithms
- SSH Birthday attacks on 64-bit block ciphers (SWEET32)
- SSH CBC vulnerability
- SSH Weak Message Authentication Code Algorithms
- SSH Server Supports diffie-hellman-group1-sha1

Examples

The example shows how to turn on extended SSH security:

```
system management sshd extended-security enabled
```

system management sub-interface

To configure a second IP for COPS server communication, use the `system management sub-interface` command.

`system management sub-interface` `ip-address` *ip-address* `cre-ip-address` *cre-ip-address* `cre-vlan-id` *cre-vlan-id*

Syntax description

ip-address	The IPv4 address of Linux network interface on COS core.
cre-ip-address	The IPv4 address and subnet mask of the default gateway for the Linux network interface.
cre-vlan-id	The vlan id of the Linux network interface of COS core

Default

This command has no default value.

Command mode

Config mode

Usage guidelines

This command configures the management sub-interface IP address and the Pacemaker resource will be created along with the Linux interface with allocation to the active cosm-m. All fields must be configured for the sub-interface to be created. The Sub-interface address will be *ip-address/cre-ip-address_subnet-mask*. After creation, deleting any parameter will delete the Pacemaker resource along with Linux interface.

system management user

Use the `system management user` command to configure users connecting to CableOS through the Out-of-Band connection.

`system management user` *user-name* `login` { *enable* | *disable* } `password` *password*

Syntax description

user-name	The user name key ID. A string representing the user name in the system. Currently, the only permitted user is *ccap*.
login	Enable/Disable user login through the Out-of-Band connection.
password	The encrypted string representing the user password. This field is available only if login is enabled.

Default

This command has no default value.

Command mode

Config mode.

Usage guidelines

Currently, the only permitted user is *ccap*. Deleting the ccap user or its password will not change the system internal password for the ccap user. It will maintain its last known password.

Related information

system management ip-address
system management sonar-service
system management telemetry

system mtu

Use the `system mtu` command to configure the MTU of the Linux interfaces..

`system mtu` *size*

Syntax description

size	MTU size. Range is 1700 to 2200, default is 2026

Default

The default MTU size is 2026.

Command mode

Config mode.

Usage guidelines

The change to the system MTU will be applied only after a cluster reboot (by running the `reboot all` command). Before rebooting, do not forget to save the configuration to startup-config.

Examples

The following example sets the MTU size to 1700:

```
system mtu 1700
```

Related information

cable mtu-enhance

show cable modem mtu

system proto-filter ds-broadcast

Use the `system proto-filter ds-broadcast` command to enable the dropping of incoming broadcast and multicast traffic on the downstream.

`system proto-throttle ds-broadcast` [`enabled`] [`disabled`] [`allowed-mac-address` *mac-address*]
no `system proto-throttle ds-broadcast` `allowed-mac-address` *mac-address*

Syntax description

`enabled`	Enables the DS broadcast and multicast filter.
`disabled`	Disables the DS broadcast and multicast filter. By default, the filter is disabled.
mac-address	A list of up to eight source MAC addresses which can omit the filter. The MAC address must be in 6-octet hexadecimal format XX:XX:XX:XX:XX:XX.

Default

By default, the filter is disabled.

Command mode

Config mode

Usage guidelines

When enabled, all incoming broadcast and multicast traffic on the DS will be dropped, except for packets with a source MAC address listed in the `allowed` *mac-address* list.

Use the no `system proto-throttle ds-broadcast` `allowed-mac-address` *mac-address* command to remove a MAC address from the list.

Use the `show running-config system proto-filter` command to display the current status of DS broadcast filtering.

Examples

To enable DS broadcast filtering and allow broadcasts from MAC addresses 00:11:22:33:44:55 and aa:bb:cc:dd:ee:ff:

```
admin@CableOS> config
Entering configuration mode terminal
admin@CableOS(config)# system proto-filter ds-broadcast allowed-mac-address
 00:11:22:33:44:55
admin@CableOS(config)# system proto-filter ds-broadcast allowed-mac-address
 aa:bb:cc:dd:ee:ff
admin@CableOS(config)# system proto-filter ds-broadcast enabled
admin@CableOS(config)# commit
Commit complete.
admin@CableOS(config)# exit
admin@CableOS> show running-config system proto-filter
system proto-filter ds-broadcast enabled
system proto-filter ds-broadcast allowed-mac-address 00:11:22:33:44:55
system proto-filter ds-broadcast allowed-mac-address aa:bb:cc:dd:ee:ff
admin@CableOS>
```

To remove MAC address 00:11:22:33:44:55 from the allowed list:

```
admin@CableOS> config
Entering configuration mode terminal
admin@CableOS(config)# no system proto-filter ds-broadcast allowed-mac-address
 00:11:22:33:44:55
admin@CableOS(config)# commit
Commit complete.
admin@CableOS(config)# exit
admin@CableOS> show running-config system proto-filter
system proto-filter ds-broadcast enabled
system proto-filter ds-broadcast allowed-mac-address aa:bb:cc:dd:ee:ff
admin@CableOS>
```

To disable DS broadcast filtering:

```
admin@CableOS> config
Entering configuration mode terminal
admin@CableOS(config)# system proto-filter ds-broadcast disabled
admin@CableOS(config)# commit
Commit complete.
admin@CableOS(config)# exit
admin@CableOS> show running-config system proto-filter
system proto-filter ds-broadcast disabled
system proto-filter ds-broadcast allowed-mac-address aa:bb:cc:dd:ee:ff
admin@CableOS>
```

system proto-throttle

Use the `system-proto-throttle` command to ensure that the CableOS server is not exposed to denial of service (DoS) attacks or other network flooding environments. To cancel the protection, use the **no** form of the command.

```
system proto-throttle [{arp | dhcp | rip | igmp | nd | dhcpv6 | mld |
total | other  | rate-pps rate-pps  | max-burst-pkts burst}]
no system proto-throttle [{arp | dhcp  | rip | igmp | nd | dhcpv6 | mld  |
total | other | rate-pps rate-pps  | max-burst-pkts burst}]
```

Syntax description

rate-pps	The number of packets per second allowed for the specified protocol. The valid range is from 1 - 16000
`max-burst-pkts`	The maximum number of packets allowed in a single burst. The valid range is 1 - 1000.

Default

The default values for the different protocols are shown below.

Protocol	Default Rate	Default Burst
ARP	2500	500
DHCP	500	250
DHCPv6	500	250
IGMP	Unlimited	Unlimited
MLD	Unlimited	Unlimited
ND	2500	500
RIP	100	50
Other	500	100
Total	5000	500

Command mode

Config mode.

Usage guidelines

Using the command without a protocol name sets the **Total** parameters. The **Total** is a second token bucket that throttles all protocols together, including **Other**.

Other throttles all non-recognized protocols. All traffic classified into **Other** as a first bucket is also throttled by **Total** as a second bucket.

Any protocols not specifically defined are treated as unlimited, including Other and Total.

If a protocol is configured with a rate but without a burst, the burst will be 25% of the defined rate.

Example

The following defines a default rate of 1500 and a maximum burst rate of 750 for the DHCP protocol:

```
system  proto-throttle dhcp rate-pps 1500 max-burst-pkts 750
```

Related information

clear system proto-throttle

show system proto-throttle

system scep

Use the `system scep` command to configure SCEP behavior.

`system scep` [`admin-state` *up/down*] [`cnf` *filename*] [`common-name` *string*] [`fingerprint` *hash*] [`number-certs` *number*] [`renew` *days*] [`server` *url*] [`timeout` *seconds*]

Syntax description

`admin-state`*up/down*	This parameter enables and disable the SCEP client and is mandatory. The default value is **down**.
`cnf`*filename*	This parameter contains the name of the CNF file which will be used by the SCEP client to generate CSR and is mandatory.
`common-name`*string*	This parameter contains a string which is used by the SCEP client to generate a unique common name per-certificate and is mandatory. **NOTE:** Only the following characters can be used in the string: • Upper and lower case letters • Numbers • Dot • Dash • Underscore All other characters are invalid. The default value is **common_name**.
`fingerprint`*hash*	This parameter contains the SHA1 hash which will be used to validate the CA certificate when it is obtained.

`number-certs`*number*	This parameter contains the number of certificates to acquire and track and is mandatory. The valid range is 1-4 and the default value is **4**.
`renew`*days*	This parameter defines the number of days before the certificate expires and renewal should start and is mandatory. The valid range is 1 -365 and the default value is **30**.
`server`*url*	This parameter contains the URL link of the SCEP server and is mandatory. Any valid URL is allowed.
`timeout`*seconds*	This parameter specifies the timeout period for SCEP operations and is mandatory. The valid range is 1 - 172800 (2 days). and the default value is **1000** (16.667 minutes).

Default

See the syntax description for the default values of each parameter.

Command mode

Config mode

Usage guidelines

CableOS requires 4 IPSEC tunnels to provide 4.8 Gbps of throughput for LI needs. The SCEP client can track 4 certificates simultaneously and renew them when needed. For more information, see the *CableOS User Guide*.

Examples

The example below shows the definition of SCEP:

```
system scep admin-state up
system scep cnf cnffile.cnf
system scep common-name scep_tunnel
system scep fingerprint E9:11:FF:F4:B5:57:AB:2F:2B:D4:C4:D0:12:0A:3F:8D:24:AC:66:04
system scep number-certs 4
system scep renew 180
system scep server http://255.255.255.255:80/scep
system scep timeout 21600
```

Related information

scep enrollment

scep renewal

show system scep

snmp-server enable traps core scep-event

tacacs-server directed-request

Use the `tacacs-server directed-request` command to send only a username to a specified server when a direct request is issued. To send the entire string to the TACACS+ server, use the **no** form of this command.

`tacacs-server directed-request` [*restricted*] [*no-truncate*]
`no tacacs-server directed-request`

Syntax description

restricted	(Optional) Restrict queries to directed request servers only.
no-truncate	(Optional) Do not truncate the @hostname from the username.

Default

Enabled.

Command mode

Config mode.

Usage guidelines

This command sends only the portion of the username before the "@" symbol to the host specified after the "@" symbol. In other words, with the directed-request feature enabled, you can direct a request to any of the configured servers, and only the username is sent to the specified server.

Disabling **tacacs-server directed-request** causes the whole string, both before and after the "@" symbol, to be sent to the default TACACS+ server. When the directed-request feature is disabled, the router queries the list of servers, starting with the first one in the list, sending the whole string, and accepting the first response that it gets from the server. The `tacacs-server directed-request` command is useful for sites that have developed their own TACACS+ server software that parses the whole string and makes decisions based on it.

With **tacacs-server directed-request** enabled, only configured TACACS+ servers can be specified by the user after the "@" symbol. If the host name specified by the user does not match the IP address of a TACACS+ server configured by the administrator, the user input is rejected.

Use **no tacacs-server directed-request** to disable the ability of the user to choose between configured TACACS+ servers and to cause the entire string to be passed to the default server.

Examples

The following example disables tacacs-server directed-request so that the entire user input is passed to the default TACACS+ server:

```
no tacacs-server directed-request
```

Related information

tacacs-server host

tacacs-server key

tacacs-server host

Use the `tacacs-server host` command to specify a TACACS+ host. To delete the specified name or address, use the **no** form of this command.

`tacacs-server host` *host-name* [*port integer*] [*timeout integer*] [*key string*] [*single-connection*]
`no tacacs-server host` *host-name*

Syntax description

`host-name`	Name or IP address of the host.
`port`	(Optional) Specifies a server port number. This option overrides the default, which is port 49.
`integer`	(Optional) Port number of the server. Valid port numbers range from 1 to 65535.
`timeout`	(Optional) Specifies a timeout value. This option overrides the default, which is 3 seconds.
`integer`	(Optional) Integer value, in seconds, of the timeout interval.
`key`	(Optional) Specifies an authentication and encryption key. This must match the key used by the TACACS+ daemon. Specifying this key overrides the key set by the global command `tacacs-server key` for this server only. **NOTE:** The following characters cannot be used in the TACACS key: • = • ? • ! • | Also, to use the \ character, the complete string must either be enclosed in double quotes or an additional \ character must be added. For example, to use a key of **harmonic\key**, the string must be entered either as "harmonic\key" or harmonic\\key

`single-connection`	(Optional) Specifies a single connection. Rather than have the router open and close a TCP connection to the server each time it must communicate, the single-connection option maintains a single open connection between the router and the server. The single connection is more efficient because it allows the server to handle a higher number of TACACS operations. Currently, it is always single-connection in cosm-aaa.

Default

No TACACS+ host is specified.

Command mode

Config mode.

Usage guidelines

You can use multiple `tacacs-server host` commands to specify additional hosts. The CableOS software searches for hosts in the order in which you specify them. Use the **port**, **timeout**, **key**, and **single-connection** keywords only when running an AAA/TACACS+ server.

Because some of the parameters of the `tacacs-server host` command override global settings made by the `tacacs-server timeout` and `tacacs-server key` commands, you can use this command to enhance security on your network by uniquely configuring individual routers.

The **single-connection** keyword specifies a single connection (only valid with CiscoSecure Release 1.0.1 or later). Rather than have the router open and close a TCP connection to the server each time it must communicate, the single-connection option maintains a single open connection between the router and the server. The single connection is more efficient because it allows the server to handle a higher number of TACACS operations.

NOTE:

The following IP ranges are reserved for internal usage by the CableOS Core Platform. IP addresses in the ranges below should not be assigned to CableOS interfaces, nor to external servers or devices with which CableOS communicates.

- fd69:b651:caf7::/48
- 10.244.0.0/16
- 172.17.0.1/16
- 192.168.3.0/24

Examples

The following example specifies a TACACS+ host named Sea_Change:

```
tacacs-server host Sea_Change
```

The following example specifies that, for authentication, authorization, and accounting (AAA) confirmation, the router consults the TACACS+ server host named Sea_Cure on port number 51. The timeout value for requests on this connection is three seconds; the encryption key is a_secret.

```
tacacs-server host Sea_Cure port 51 timeout 3 key a_secret
```

Related information

aaa accounting

aaa authorization

tacacs-server key

tacacs-server key

Use the `tacacs-server key` command to set the authentication encryption key used for all TACACS + communications between the access server and the TACACS+ daemon. To disable the key, use the **no** form of this command.

`tacacs-server key` *key*
`no tacacs-server key` [*key*]

Syntax description

<table>
<tr><td><i>key</i></td><td>Key used to set authentication and encryption. This key must match the key used on the TACACS+ daemon.
<b>NOTE:</b> The following characters cannot be used in the TACACS key:
• =
• ?
• !
• |
Also, to use the \ character, the complete string must either be enclosed in double quotes or an additional \ character must be added. For example, to use a key of <b>harmonic\key</b>, the string must be entered either as
"harmonic\key"
or
harmonic\\key</td></tr>
</table>

Default

There is no default for this command.

Command mode

Config mode.

Usage guidelines

After enabling authentication, authorization, and accounting (AAA) with the `aaa new-model` command, you must set the authentication and encryption key using the `tacacs-server key` command.

The key entered must match the key used on the TACACS+ daemon. All leading spaces are ignored; spaces within and at the end of the key are not. If you use spaces in your key, do not enclose the key in quotation marks unless the quotation marks are themselves part of the key.

Examples

The following example sets the authentication and encryption key to "dare to go":

```
tacacs-server key dare to go
```

Related information

aaa new-model

tacacs-server host

telnet

Use the `telnet` command to enable and disable the telnet connection to the Core.

```
telnet
{enable | disable}
```

Default

By default, the connection is enabled.

Command mode

Config mode.

Example

The following example enables the telnet connection:

```
telnet enable
```

Related information

ssh

terminal monitor

Use the `terminal monitor` command as an alias for the `start logging monitor` command and the `no terminal monitor` command as an alias for the `stop logging monitor` command.

```
terminal monitor
no terminal monitor
```

Syntax description

This command has no arguments or keywords.

Command mode

Exec mode.

Usage guidelines

Use this command exactly as you would use the `start logging monitor` and `stop logging monitor` commands.

Examples

The following example stops displaying the log:

```
no terminal monitor
```

Related information

start logging monitor

stop logging monitor

test cable dbc

Use the `test cable dbc` command to perform a Dynamic Bonding Change (DBC) by moving a target cable modem, as specified by MAC address, to a specific us/ds bonding group using the initialization technique specified.

`test cable dbc <mac-address>` [*dsVC:VS/PP:B* | *usVC:VS/PP:B* | *rcs <channel set>* | *tcs <channel set>*] [`init-tech` *name*] [`force`]

Syntax description

`mac-address`	The MAC address of the cable modem to be moved for the DBC test.
dsVC:VS/PP:B	Select a downstream bonding group configured with 'cable mac-domain VC:VS/PP.0 ds-bonding group B: dsVC:VS/PP:B'.
usVC:VS/PP:B	Select upstream bonding group configured with 'cable mac-domain VC:VS/PP.0 us-bonding group B: usVC:VS/PP:B'.

rcs <channel set>	Receive Channel Set (downstream) followed by channel IDs in the format <ds-chan-id-0-start>[-<ds-chan-id-0-end>][,<ds-chan-id-k-start>][-<ds-chan-id-k-end>][,Of<ofdm-chan-id-m-start>][-Of<ofdm-chan-id-m-end>] If the ds-dynamic-bonding-group is enabled, then if the target channel set exists in the system, the CM will simply be moved. If the channel set does not exist, it will be created and then the CM will be moved. If the ds-dynamic-bonding-group is disabled, then the CM move will occur ONLY if the target channel set exists as a statically configured downstream bonding group.
tcs <channel set>	Transmit Channel Set (upstream) followed by channel IDs in the format <us-chan-id-0-start>[-<us-chan-id-0-end>][,<us-chan-id-k-start>][-<us-chan-id-k-end>][,Of<ofdma-chan-id-m-start>][-Of<ofdma-chan-id-m-end>] The CM will be moved ONLY if the target channel set corresponds to an already configured US bonding group. Otherwise, unexpected behavior, such as a CM reboot, could occur.
`init-tech`	The initialization technique to be used for the DBC transaction.
name	The initialization technique name: **reinit** Reinitialize the Mac DBC initialization technique (0) **initial** Broadcast initial ranging DBC initialization technique (1) **ranging** Unicast ranging DBC initialization technique (2) **station** Broadcast or unicast ranging DBC initialization technique (3) **IMPORTANT:** It is prohibited to configure the DLB init-tech greater than 1 if the BCM3160 revision is less than B2.
`force`	If a CM is running UGS, a warning message will be given. To perform the DBC despite this, re-run the command with `force`.

Default

There is no default for this command.

Command mode

Exec mode.

Usage guidelines

This command is used ONLY for DOCSIS 3.0 and 3.1 CMs.

According to the MULPI specification (11.5.1.6.2), the CMTS MUST NOT use the ranging and station init techniques if the DBC-REQ message contains an RCC that affects the CM's Primary Downstream Channel and that change results in a timing change. As we cannot check if the timing will be changed, we do not allow a DBC transaction, which will lead to a primary DS change.

For upstream DBC, review the response to the `test dbc` command. If, on review, you need to resend the command for the CM to a different bonding group, you should wait for one minute before sending the command to that CM.

When you choose an initialization technique, consider the following:

- reinit

  The use of this initialization technique (initialization technique 0 - reinitialize the MAC), results in the longest interruption of service. The CMTS MUST signal the use of this technique when QoS resources will not be reserved on the new channel(s), when the downstream channel of a DOCSIS 3.0 CM confirmed with Multiple Receive Channel Support is changed, or when the upstream channel of a DOCSIS 3.0 CM to which a Transmit Channel Configuration was assigned in the registration process is changed. The CMTS MUST use initialization technique 0 in DCC messages to DOCSIS 3.1 CMs. The CMTS MUST use initialization technique 0 in DCC messages to DOCSIS 3.0 CMs operating in Multiple Transmit Channel mode and Multiple Receive Channel mode.
- initial

  The use of this initialization technique (initialization technique 1 - broadcast initial ranging) may also result in a lengthy interruption of service. However, this interruption of service is mitigated by the reservation of QoS resources on the new channel(s). The service interruption can be further reduced if the CMTS supplies downstream parameter sub-TLVs and the UCD substitution TLV in the DCC-REQ, in addition to providing more frequent initial ranging opportunities on the new channel.
- ranging

  The use of this initialization technique (initialization technique 2 - unicast ranging) offers the possibility of only a slight interruption of service. In order to use this initialization technique, the CMTS MUST:

  - Synchronize timestamps (and downstream symbol clocks for S-CDMA support) across the downstream channels involved and specify SYNC substitution sub-TLV with a value of 1 if the downstream channel is changing.
  - Include the UCD substitution in the DCC message if the upstream channel is changing.

  However, the CMTS MUST NOT use this initialization technique if:

  - The DCC-REQ message requires the CM to switch between S-CDMA and TDMA.
  - Propagation delay differences between the old and new channels will cause the CM burst timing to exceed the ranging accuracy requirements of DOCSIS PHY 3.1.
  - Attenuation or frequency response differences between the old and new upstream channels will cause the received power at the CMTS to be outside the limits of reliable reception.
- station

  The use of this initialization technique (initialization technique 3 - initial ranging or periodic ranging) offers the possibility of only a slight interruption of service. This value might be used when there is uncertainty when the CM may execute the DCC command, and thus a chance that it might miss station maintenance slots. However, the CMTS MUST NOT use this initialization technique if the conditions for using the reinit and initial techniques are not completely satisfied.

Examples

The following example moves a CM from MAC address fc52.8d5e.7eba to downstream bonding group Ds1:10/11:D16A using the initial initialization technique:

```
test cable dbc fc52.8d5e.7eba Ds1:10/11:D16A init-tech initial
```

The following example moves a CM from MAC address fc52.8d5e.7eba to downstream bonding group Ds1:10/11:D16A using the initial initialization technique when the CM is running UGS:

```
test cable dbc fc52.8d5e.7eba Ds1:10/11:D16A init-tech initial
```

```
CM has a voice call in progress
```

```
test cable dbc fc52.8d5e.7eba Ds1:10/11:D16A init-tech initial force
```

Output columns

Message	Reason
Done	Successfully performed DBC action.
Failed	Failed to perform DBC action.
Internal error: request timed-out.	Timeout while waiting for response from CMTS.
No CM(s) found.	No CM with such MAC address.
Error: Wrong parameters. CM is on different MAC domain than BG you are trying to move to	Moving between MAC domains is not allowed.
Error: Wrong parameters. Target bonding group admin-state not Up	Target bonding group admin state MUST be Up.
Error: Wrong parameters. There are DOCSIS 2.0 modems in set. DBC is allowed only for DOCSIS 3.0 and higher.	DBC is allowed only for DOCSIS 3.0 and 3.1 CMs.
Error: Wrong parameters. Moving CMs with DOCSIS version pre 3.1 to BG with OFDM channels is not allowed.	Moving a DOCSIS 3.0 CM to a bonding group with an OFDM channel in it is not allowed.

Message	Reason
Error: Wrong parameters. Moving CMs to bonding group larger than CM is capable to handle is not allowed.	Moving a CM between bonding groups with different sizes is not allowed.
CM has a voice call in progress	Voice calls are currently taking place on this CM. To perform DBC, re-run the command with the `force` keyword added, as shown in the examples.
Cannot move modem on requested channel set.	The requested modem cannot be moved to the requested channel.
Cannot find compatible downstream static bonding group.	There is no compatible downstream static bonding group on the requested channel.
Channels assignment failed.	
Modem failed to recover/ remove. Trying to rollback failed operation for [list of partial ids].	After being moved, the modem failed to recover. The system will attempt to roll back the move operation.

<table>
<tr><th>Message</th><th>Reason</th></tr>
<tr><td>MULPI confirmation codes
<b>Note</b>: For a full list of confirmation codes, see the MULPI spec.</td><td>Various confirmation codes from MULPI will be displayed. For example:
<table>
<tr><td><b>Code 200</b>
<b>reject-major-service-flow-error</b></td><td>Indicates that the REQ message did not have either a SFR or SFID in a service flow encoding, and that service flow major errors were the only major errors.</td></tr>
<tr><td><b>Code 201</b>
<b>reject-majorclassifier-error</b></td><td>Indicates that the REQ message did not have a classifier reference, or did not have both a classifier ID and a Service Flow ID, and that classifier major errors were the only major errors.</td></tr>
<tr><td><b>Code 203</b>
<b>reject-multiple-major-errors</b></td><td>Indicates that the REQ message contained multiple major errors of types 200 or 201.</td></tr>
<tr><td><b>Code 204</b>
<b>reject-message-syntax-error</b></td><td>Indicates that the REQ message contained syntax error(s) (for example, a TLV length error) resulting in parsing failure.</td></tr>
<tr><td><b>Code 205</b>
<b>reject-prinmary-service-flow-error</b></td><td>Indicates that a REG-REQ, REG-REQMP, REG-RSP, or REG-RSP-MP message did not define a required primary Service Flow, or a required primary Service Flow was not specified active.</td></tr>
<tr><td><b>Code 206</b>
<b>reject-message-too-big</b></td><td>Indicates that the length of the message neede to respond exceeds the maximum allowed message size.</td></tr>
<tr><td><b>Code 207</b>
<b>reject-invalid-modem-capabilities</b></td><td>Indicates that the REG-REQ or REG-REQ-MP contained either an invalid combination of modem capabilities or modem capabilities that are inconsistent with the services in the REG-REQ or REG-REQMP.</td></tr>
<tr><td><b>Code208</b>
<b>relect-bad-rcc</b></td><td>Indicates that the message contained an invalid Receive Channel Configuration.</td></tr>
<tr><td><b>Code 209</b>
<b>reject-bad-tcc</b></td><td>Indicates that the message contained an invalid Transmit Channel Configuration.</td></tr>
<tr><td><b>Code 210</b>
<b>reject-dynamic-range-window-violation</b></td><td>Indicates that channels added or deleted by the REGRSP-MP or DBC-REQ would have resulted in a dynamic range</td></tr>
</table>
</td></tr>
</table>

Related information

cable mac-domain * dbc-active-call

test cable dcc

show cable load-balance distribution

test cable dsd

test cable dcc

Use the `test cable dcc` command to perform a Dynamic Channel Change (DCC) by moving a target cable modem, as specified by MAC address, to a specific us/ds channel using the initialization technique specified.

`test cable dcc mac-address { ds-channel | us-channel } [ init-tech` *name* `] [ force ]`

Syntax description

`mac-address`	The MAC address of the cable modem to be moved for the DCC test
`ds-channel`	Downstream RF channels configured with *cable ds-rf-port VC:VS/PP down-channel C*
`us-channel`	Upstream logical channels configured with *cable us-rf-port VC:VS/PP us-phy-channel C us-logical-channel L*
`init-tech`	The initialization technique to be used for the DCC transaction
name	The initialization technique name: • reinit (0) • initial (1) • ranging (2) • station (3) **IMPORTANT:** It is prohibited to configure the DLB init-tech greater than 1 if the BCM3160 revision is less than B2.
`force`	If a CM is running UGS, a warning message will be given. To perform the DCC despite this, re-run the command with `force`.

Default

There is no default for this command.

Command mode

Exec mode.

Usage guidelines

When you choose an initialization technique, take the following into consideration:

- reinit

  This initialization technique (initialization technique 0 - reinitialize the MAC) is suitable for DOCSIS 2.0 and DOCSIS 3.0 CMs only. The use of this initialization technique, results in the longest interruption of service.

  For 3.0 CMs, the technique is relevant only when the CM is using a Single Receive/Transmit Channel.
- initial

  The use of this initialization technique (initialization technique 1 - broadcast initial ranging) may also result in a lengthy interruption of service. However, this interruption of service is mitigated by the reservation of QoS resources on the new channel(s). The service interruption can be further reduced if the CMTS supplies downstream parameter sub-TLVs and the UCD substitution TLV in the DCC-REQ in addition to providing more frequent initial ranging opportunities on the new channel.
- ranging

  The use of this initialization technique (initialization technique 2 - unicast ranging) offers the possibility of only a slight interruption of service. In order to use this initialization technique, the CMTS MUST:

  - Synchronize timestamps (and downstream symbol clocks for S-CDMA support) across the downstream channels involved and specify SYNC substitution sub-TLV with a value of 1 if the downstream channel is changing.
  - Include the UCD substitution in the DCC message if the upstream channel is changing.

  However, the CMTS MUST NOT use this initialization technique if:

  - The DCC-REQ message requires the CM to switch between S-CDMA and TDMA
  - Propagation delay differences between the old and new channels will cause the CM burst timing to exceed the ranging accuracy requirements of DOCSIS PHY 3.1.
  - Attenuation or frequency response differences between the old and new upstream channels will cause the received power at the CMTS to be outside the limits of reliable reception.
- station

  The use of this initialization technique (initialization technique 3 - initial ranging or periodic ranging) offers the possibility of only a slight interruption of service. This value might be used when there is uncertainty when the CM may execute the DCC command and thus a chance that it might miss station maintenance slots. However, the CMTS MUST NOT use this initialization technique if the conditions for using the reinit and initial techniques are not completely satisfied.

Examples

The following example moves a CM from MAC address fc52.8d5e.7eba to downstream bonding group Ds1:10/11:D16A using the initial initialization technique:

```
test cable dbc fc52.8d5e.7eba Ds1:10/11:D16A init-tech initial
```

The following example moves a CM from MAC address fc52.8d5e.7eba to downstream bonding group Ds1:10/11:D16A using the initial initialization technique when the CM is running UGS:

```
test cable dbc fc52.8d5e.7eba Ds1:10/11:D16A init-tech initial
```

```
CM has a voice call in progress
```

```
test cable dbc fc52.8d5e.7eba Ds1:10/11:D16A init-tech initial force
```

Output columns

Message	Reason
Done	Successfully performed DCC action
Failed	Failed to perform DCC action
Internal error: request timed-out.	Timeout while waiting for response from CMTS
No CM(s) found.	No CM with such a MAC address
Error: Wrong parameters. DCC to non-primary channel is not allowed.	Move to non-primary channel is not allowed
CM has a voice call in progress	Voice calls are currently taking place on this CM. To perform DCC, re-run the command with the `force` keyword added, as shown in the examples.
Modem went to offline state.	After running the `dcc` command, the modem went offline.

Related information

cable mac-domain * dbc-active-call
test cable dbc
show cable load-balance distribution
test cable dsd

test cable dsd

Use the `test cable dsd` command to delete dynamic service-flows on the CMTS by starting CMTS-initiated DSD transactions.

`test cable dsd` <*mac-address*>

`test cable dsd` <*ip-address*>

`test cable dsd service-flow` <*mac-domain*> <*service-flow*>

Syntax description

mac-address	CM MAC address in the format of <hhhh.hhhh.hhhh>.
ip-address	CM IP address in the format of <ddd.ddd.ddd.ddd> for IPv4 or <hhhh:hhhh:hhhh:hhhh:hhhh:hhhh:hhhh:hhhh> for IPv6.

mac-domain	MAC domain in the format of <mdNN:SS/NN.D>.
service-flow	Service-Flow ID to delete.

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

The `test cable dsd` command allows the user to delete dynamic service-flows from online CMs. The command is not a valid command by itself. It will return a syntax error: expecting 'service-flow'

Examples

```
ccap@CableOS>  test cable dsd acb3.131c.6cdb
```

```
ccap@CableOS> test cable dsd service-flow md1:10/11.0 23
```

Related information

test cable dbc

test cable dcc

trigger dlm mac-domain

Use the trigger dlm mac-domain command to trigger a DEPI Latency Measurement (DLM) command and print the results.

`trigger dlm mac-domain` *md-name*

Syntax description

md-name	A MAC domain name in the form md *vc:vs/pp.d* where: • md is a constant • *vc:vs* identifies a remote PHY device configured with *cable rpd vc:vs* • *pp* identifies the single downstream/ upstream RF port of the mac-domain • *d* identifies a MAC domain on the rf-port, which config for the current release must be 0

Default

This command has no default value.

Command mode

Exec Mode

Usage guidelines

DLM is an internal process that measures the latency from the Core to the RPD. The DLM process sends the latency per session to the CableOS Central Analytics Dashboards. The CableOS Central Analytics Dashboards display the average latency per MAC Domain.

The DLM is the estimated transmission propagation delay from the CCAP Core to the RPD. It is calculated as follows:

- The Core sends a DLM packet with the current timestamp
- RPD gets the DLM packet – puts its timestamp and sends it back to the Core
- The Core calculates the latency between the Core and the RPD

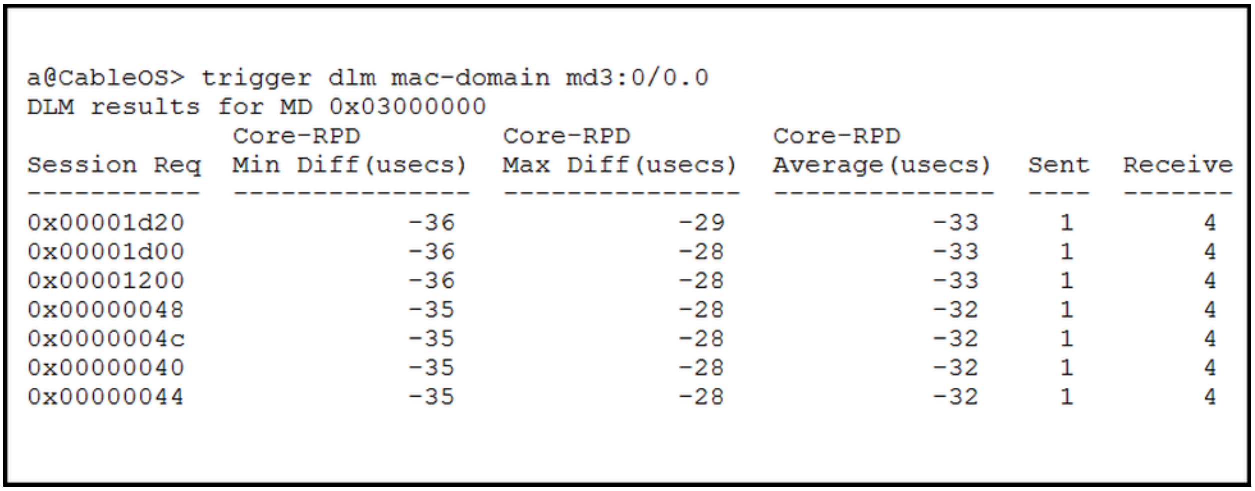
For a fuller explanation of DLM, see the **Monitoring and Troubleshooting** section of the *CableOS User Guide*.

Example

The following command triggers DLM

```
trigger dlm mac-domain md3:0/0.0
```

The following shows the output that can be obtained from such a command:



```
a@CableOS> trigger dlm mac-domain md3:0/0.0
DLM results for MD 0x03000000
             Core-RPD          Core-RPD          Core-RPD
Session Req  Min Diff(usecs)   Max Diff(usecs)   Average(usecs)   Sent   Receive
-----------  ---------------   ---------------   --------------   ----   -------
0x00001d20               -36               -29              -33      1         4
0x00001d00               -36               -28              -33      1         4
0x00001200               -36               -28              -33      1         4
0x00000048               -35               -28              -32      1         4
0x0000004c               -35               -28              -32      1         4
0x00000040               -35               -28              -32      1         4
0x00000044               -35               -28              -32      1         4
```

Output columns

Field	Description
Session Req	The Session ID of the DLM request
Core-RPD Min Diff (usecs)	The minimum difference in microseconds
Core-RPD Max Diff (usecs)	The maximum difference in microseconds
Core-RPD Average (usecs)	The average difference in microseconds
Sent	The number of DLMs sent
Receive	The number of DLMs received

update cable rpd mso-cvc-chain

Use the `update cable rpd mso-cvc-chain` command to install the Operator certificate to the PRD. The certificate will be sent via GCP.

`update cable rpd` <*rpd_identifier*> `mso-cvc-chain` <*path*>

To disable the MSO CVC check during the upgrade, use the **disable** form of the command:

`update cable rpd` <*rpd_identifier*> `mso-cvc-chain disable`

Syntax description

The <rpd_identifier> can be one of these formats:

- <chassis:slot>
- <hhhh.hhhh.hhhh> - MAC address
- <ddd.ddd.ddd.ddd> - IPv4 address

The <path> can be one of these formats:

- http://<host>[:port]/<path>
- tftp://<host>[:port]/<path>
- file://<path>
- <path> - path in the file system

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

The operator must provide the certificate chain, which consists of 2 certificates: CVC CA and MSO CVC.

The signature of the CodeFile and the certificate installed to the RPD interoperate as follows: If the RPD receives a co-signed image, it tries to verify the Operator signature using PKI procedures. If verification fails, the image is not installed.

Possible reasons for verification failure are:

- The image was co-signed with the Operator but no Operator certificate was installed to the RPD.

  Solution: Install the Operator certificate (MSO CVC) using the commands provided above.

- The image was not co-signed by the Operator but the Operator certificate was installed to the RPD. Installation of any image not signed as approved by the Operator will be rejected.

  Solution 1: Remove the MSO CVC from the Pebble by using the command provided above. **Important!** This will allow installation of CodeFiles unsigned by the Operator.

  Solution 2: Co-sign the CodeFile with a private key that corresponds to a certificate installed on the Pebble.

- The image was co-signed by the Operator and the certificate was installed to RPD, but the installation still fails.

  Solution: Verify that the MSO CVC installed on the Pebble and the Private Key used for co-signing the CodeFile correspond with each other.

Examples

```
update cable rpd 1:0 mso-cvc-chain http://example.com:8080/mso_chain.pem
```

```
update cable rpd 1:0 mso-cvc-chain /home/ccap/mso_chain.pem
```

```
update cable rpd 1:0 mso-cvc-chain disable
```

```
update cable rpd 200.200.61.51 mso-cvc-chain disable
```

username

Use the `username` command to establish a username-based authentication system. Use the **no** form of this command to remove an established username-based authentication.

`username` *name* [`privilege-level` *privilege-level*] [`password` *password*]
`no username name`

Syntax description

name	Host name, server name, user ID, or command name.
privilege-level	A number between 0 and 15 that sets the privilege level for the user.
password	Sets the password for the user.

Default

The default privilege level is 1.

Command mode

Config mode.

Usage guidelines

The `username` command provides username or password authentication, or both, for login purposes only.

Add a username entry for each remote system with which the local router communicates and from which it requires authentication. The remote device must have a username entry for the local router. This entry must have the same password as the local router's entry for that remote device.

Operators can change the password for the local login account *admin*.

Examples

The following example adds a new user with the name *admin* and a privilege-level of 15:

```
username admin privilege-level 15
```

Related information

privilege

privilege

validate-iso-md5

Before an upgrade, use the `validate-iso-md5` command to perform an MD5 hash check on the downloaded CableOS image file.

`validate-iso-md5` *filename*

Syntax description

filename	The name of the CableOS image file to be checked.

Default

This command has no default value.

Command mode

Exec mode.

Usage guidelines

The `install` command performs an MD5 hash check. However, if the file does not pass the check, there may not be enough time to download a new file and complete the upgrade in the available maintenance window. The `validate-iso-md5` enables the MD5 check to be performed in advance of the maintenance window so that, if necessary, a new file can be downloaded.

While the check is running, the following message will be displayed:

```
Validating MD5 checksum...
```

When the check has finished, the following message will be displayed:

```
Validating MD5 checksum... OK
```

Example

The following example will check the CableOS image file `Cos-release-1.9.1.0-5+auto71.iso`:

```
admin@CableOS> validate-iso-md5 Cos-release-1.9.1.0-5+auto71.iso
```

Related information

install
show images
show version
show version cluster-nic
show version cluster-server
install
show upgrade process
reboot passive all
reboot passive hitless
show version cluster-server all

Appendix A

Contacting Harmonic technical support

- *Harmonic Technical Assistance Center contact information*
- *Harmonic corporate contact information*

Harmonic Technical Assistance Center contact information

A list of phone numbers, e-mail addresses, and important links for the Harmonic Technical Assistance Center (TAC).

Table A-1: Harmonic Technical Assistance Center phone numbers and email addresses

Region	**Telephone Technical Support**	**Email**
Americas	888.673.4896 (888.MPEG.TWO) 408.490.6477	*support@harmonicinc.com*
Europe, the Middle East and Africa (EMEA)	+44.1252.555.450	*emeasupport@harmonicinc.com*
India	+91.120.498.3199	*apacsupport@harmonicinc.com*
China	+86.10 5798.2626	*chinasupport@harmonicinc.com*
Japan	+81.3.5614.0524	*japansupport@harmonicinc.com*
Asia Pacific (APAC) – Other Territories	+852.3184.0045 +65.6542.0050	*apacsupport@harmonicinc.com*

Support URLs

Report an Issue Online: *https://www.harmonicinc.com/technical-support/report-issue/*

Technical Support: *https://www.harmonicinc.com/technical-support/*

Software download location for Cable Edge products

ftp://ftp.harmonicinc.com

Contact Harmonic Technical Publications

techdocs@harmonicinc.com

Harmonic corporate contact information

Phone numbers and addresses for the corporate office.

Harmonic corporate address

2590 Orchard Parkway
San Jose, CA 95131
U.S.A.

Harmonic corporate telephone numbers

Tel. +1.800.828.5521 (from the U.S. and Canada)
Tel. +1.408.542.2559 (outside the U.S. and Canada)
Fax.+1.408.542.2511

www.harmonicinc.com